Railway Age

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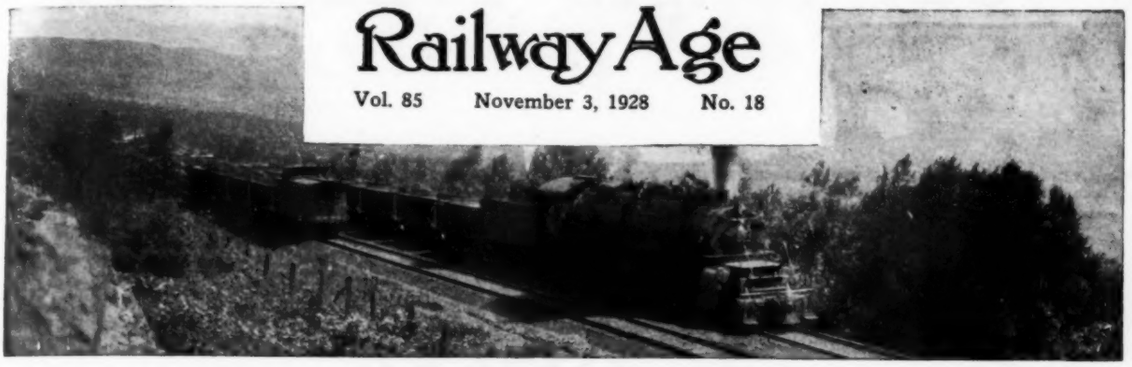

On the Duluth, Missabe & Northern near Duluth, Minn.

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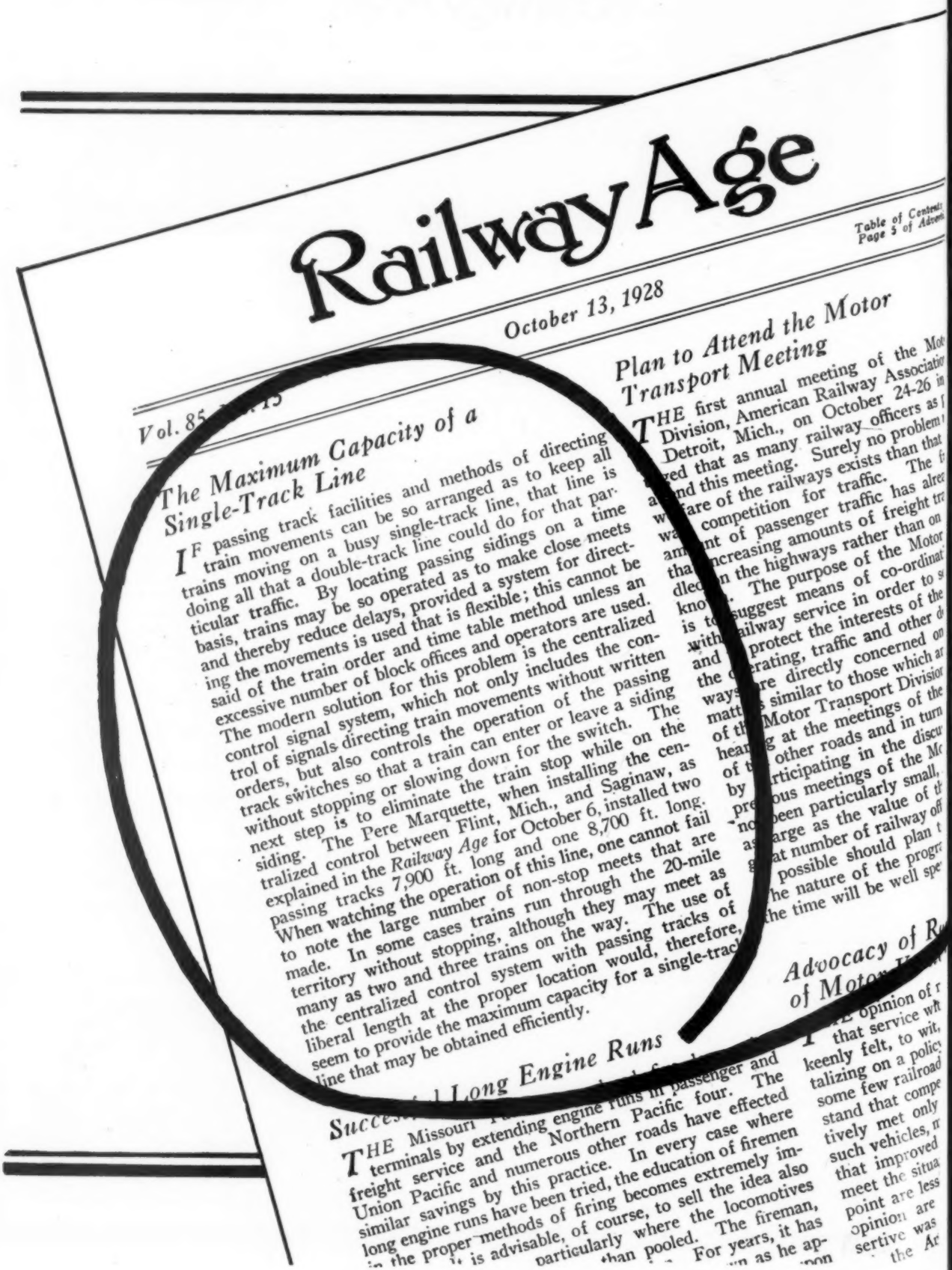
Is your Single Track serving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The Maximum Capacity of a Single-Track Line

IF passing track facilities and methods of directing train movements can be so arranged as to keep all trains moving on a busy single-track line, that line is doing all that a double-track line could do for that particular traffic. By locating passing sidings on a time basis, trains may be so operated as to make close meets and thereby reduce delays, provided a system for directing the movements is used that is flexible; this cannot be said of the train order and time table method unless an excessive number of block offices and operators are used. The modern solution for this problem is the centralized control signal system, which not only includes the control of signals directing train movements without written orders, but also controls the operation of the passing track switches so that a train can enter or leave a siding without stopping or slowing down for the switch. The next step is to eliminate the train stop while on the siding. The Pere Marquette, when installing the centralized control between Flint, Mich., and Saginaw, as explained in the *Railway Age* for October 6, installed two passing tracks 7,900 ft. long and one 8,700 ft. long. When watching the operation of this line, one cannot fail to note the large number of non-stop meets that are made. In some cases trains run through the 20-mile territory without stopping, although they may meet as many as two and three trains on the way. The use of the centralized control system with passing tracks of liberal length at the proper location would, therefore, seem to provide the maximum capacity for a single-track line that may be obtained efficiently.

Plan to Attend the Motor Transport Meeting

THE first annual meeting of the Mot Division, American Railway Association Detroit, Mich., on October 24-26 in red that as many railway officers as p nd this meeting. Surely no problem are of the railways exists than that competition for traffic. The f nt of passenger traffic has alre creasing amounts of freight tra n the highways rather than on The purpose of the Motor suggest means of co-ordinat ilway service in order to s protect the interests of the rating, traffic and other d re directly concerned on similar to those which ar Motor Transport Divisio at the meetings of the other roads and in turn rticipating in the discu ous meetings of the Mo been particularly small, as the value of th at number of railway off possible should plan t he nature of the progr he time will be well spe

Successful Long Engine Runs

THE Missouri P... terminals by extending engine runs in passenger and freight service and the Northern Pacific four. The Union Pacific and numerous other roads have effected similar savings by this practice. In every case where long engine runs have been tried, the education of firemen in the proper methods of firing becomes extremely important; it is advisable, of course, to sell the idea also particularly where the locomotives than pooled. The fireman, For years, it has ...n as he ap-

Advocacy of R... of Motor ...

THE opinion of r... that service wh... keenly felt, to wit, ... talizing on a policy ... some few railroad ... stand that compe... tively met only ... such vehicles, ... that improved ... meet the situa... point are less ... opinion are ... sertive was ... the Ar...

Railway Age

Vol. 85, No. 18 November 3, 1928

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Foresight Brings Results

THE value of advance planning for the use of a new facility is amply illustrated in the performance records for September of the new yard of the Pennsylvania at Crestline, Ohio. The steps taken to insure good performance at this yard, after additional facilities were opened on August 15, were described in the *Railway Age* of October 20, page 773. During September, the first full month of operation of the new facilities, 110,136 cars were handled through the yard, while on September 30 the record-breaking total of 4,413 cars was handled without delays, and no trains were held out of the yard. The new and increased facilities have aided materially in producing this efficient and improved performance, but the credit for such efficiency within such a short time after the yards were opened goes back to the advance planning of the yard operations and the complete instructions as to classification and handling which were available on the day the new facilities were put in service.

The Traveling Engineer as an Instructor

THE traveling engineer's primary function is to know locomotive conditions and cooperate in expediting train movement. His next most important duty, which however, is so closely allied with the first as to be practically inseparable, is to provide instruction for engine crews. Past achievements in locomotive performance have been due in no small measure to the effectiveness with which traveling engineers have fulfilled their duties. When they fail to a degree, as sometimes happens, it is more often due to lack of instructive, supervising and leadership ability, than to a lack of knowledge of mechanical details. For example, while somewhat difficult to believe, it is reliably reported that when an engineman was recently inspecting a new locomotive assigned to his run, noticing a certain device in the firebox, he asked what that "gadget" was. It was a soot blower. Such a question leads to the assumption that other important details about that locomotive or its operation were probably unknown to the engineman because the traveling engineer could not, or at least did not, give him the necessary advance instruction. Any railroad which overloads its traveling engineers with responsibility for too many locomotives and crews, or permits them to spend an excessive amount of time "trouble shooting," instead of applying preventive measures, is defeating its own ends. As nearly as possible, 100 per cent performance of traveling engineers' duties should be the goal; otherwise undesirable locomotive conditions will continue largely undetected; crews will develop wasteful or unsafe practices through lack of instruction; fuel will be wasted, train operation delayed, and railroad net income reduced. Traveling engineers should be encouraged to examine themselves critically to discover and remedy their own weak points, improve their knowledge of mechanical details and general railroad operation, and in particular, fit themselves for what is perhaps their most important task, namely that of leadership and instruction.

Upturn Continues in Equipment Orders

DOMESTIC orders for railway equipment, reported in the *Railway Age* during October, were above the October, 1927, freight car and passenger train car orders while the number of locomotives ordered remained the same. This is the second successive month in which freight car orders have been substantially above those of the corresponding 1927 month, while locomotive orders have exceeded or equalled those reported in 1927 during each of the past four months. In October, 1928, a total of 1,635 units of freight equipment were ordered, against orders for only nine units in October, 1927. Likewise in September of this year 1,236 freight cars were ordered, whereas only 357 were ordered in September, 1927. This change in the trend of freight car orders set in after orders in four 1928 months had been substantially under those for the corresponding 1927 periods—September was the first 1928 month since April in which 1928 freight car orders were above those of 1927. Finally, 1928 passenger train car orders are approximately 40 per cent above those reported during the first ten months of 1927. These favorable indications, substantiated by the fact that inquiries are now pending for more than 9,000 units of freight equipment, make reasonable the prediction that a definite upturn has begun and that equipment manufacturers may now view the situation with more hope than has been possible at any other time during the current year.

A Straw Vote of 1929 Maintenance Activities

AT this time when straw votes and other forecasts of future events are much in the public mind, it may not be amiss to call attention to the rail orders that are now being placed, as an indication of the attitude of railway managements towards the business outlook for 1929 and towards the continuation of the liberal roadway improvement program during the next year. One such straw vote is afforded by the announcement within the last two weeks by the Pennsylvania that it has authorized the purchase of 260,000 tons of rails,

supplemented by the statement that while this figure is 40,000 tons less than that authorized a year ago, it is larger than for any other preceding year and considerably above the five and ten-year averages. Likewise the New York Central Lines have issued inquiries for 190,000 tons for their next year's needs as compared with 188,000 tons a year ago, while the Atchison, Topeka & Santa Fe has ordered 114,000 tons as compared with 121,000 tons a year ago. These figures are illustrative of the requirements which have already been made public by 10 or 12 of the leading roads whose combined needs aggregate approximately one-third of the total annual production. While these figures indicate that the total demand may fall slightly below that of a year ago, this prospective decrease is due to the increased service that is now being secured from heavier sections, improved mill practice, the building up of the battered ends to extend the life of rails, etc., rather than from any slackening of maintenance activities. On the contrary, in so far as rail purchases reflect maintenance activities in general, and there is no better indication, they indicate that 1929 will be another year of active betterment of the roadway and structures.

Car Shop Tools Vitally Affect Costs

RAILWAY officers may well take a keen interest in car shop tools because these tools, whether comprising heavy car wheel lathes or hand tools used by repair men, constitute a large investment and have a vital relation to the quality and cost of car maintenance work. At a recent national gathering of car department officers, it was emphasized time and again that men cannot work efficiently without the proper tools. One member said "I never allow a man to use a car repair hammer, or what is known as the ball pein hammer for siding, because he will use more blows to put the nail home and he will mark the siding, whereas a man experienced in handling a 2½-lb. hatchet, day in and day out, will never mark a siding and he will never use more than two blows besides the starter for tenpenny nails, or one blow besides the starter for roofing nails." Heavy machinery requirements should be analyzed thoroughly and systematically, new methods and tools being introduced if actual checks of the work performed show that adequate savings will result. It was testified at the meeting referred to that two portable pressure riveters, for example, purchased for use in rebuilding 2,000 coal cars, "approximately doubled the output per man hour, decreased the cost of driving $.008 per rivet, and also gave us a much better grade of work than could have been performed with a pneumatic hammer." In another instance, the installation of a journal-turning lathe, which permitted turning car journals without dismounting the wheels, resulted in a saving of 82 cents per pair of wheels having the journals turned. The wheel shop was equipped with new machinery, including a modern wheel lathe, double-head axle lathes, boring mills, a double-acting wheel press, etc., as a result of which the wheel shop force was said to have been reduced 36 per cent, accompanied by a corresponding reduction in the cost of operation. The car departments' requests for modern tools, when backed up by careful, comprehensive studies of possible savings, deserve the sympathetic consideration and the hearty support of railway managements.

Patents and Purchasing

SINCE the United States patent office was established, it has issued over 350,000 patents on devices or processes of direct or possible significance to the railroads. Over 5,000 patents of this sort are now being issued each year while more than 500 patents of special interest to the railroads expire annually.

Not all patented ideas reach the market, but a large part of the materials and supplies which the railroads buy in the course of a year are patented. This is particularly true of car and locomotive parts; it is also true that the volume of patented materials employed in the construction and maintenance of track and roadway structures is increasing rapidly.

Opposition has frequently been observed among railway men to the purchase or use of patented equipment or materials. Much interest is sometimes taken in a new device or process until patents are broached, when the going becomes harder. If the idea is compelling, a patent will not stop it, but the resistance is often too much to enable a device to achieve success solely upon its merit.

This prejudice against patented articles is not wholly without justification. Patent history is replete with attempts of individuals to acquire rights in ideas which they did not originate and to which, for other reasons, they were not morally entitled, while the intent of patentees has frequently appeared to be, not the desire of the true inventor to contribute to progress by making something better than was made before, or to provide a new solution of some problem, but the desire to possess the right simply as a means of exacting toll from those who employ the idea.

Railway buyers also know that a patent is intended to give the patent holder a monopoly on the production of the device patented, and thus restrict competition. They also assume that the price of such an article reflects the payment of royalties, and is higher than would prevail if competition could be secured in its production, while they fear that the price might become still higher if a road were placed under the practical necessity of continuing the article in use after having introduced it.

These ramifications of the patent problem should not cause railroads to shun the purchase or adoption of patented things, however, and they can hardly be said to give a railroad a right to appropriate patented ideas and produce them in its own shops. The former is not the liberal attitude that is essential to progress, and the latter is scarcely less culpable than practices of which railway men complain.

The government has purposely granted to inventors a monopoly on the production of their ideas for a specific period for the purpose of stimulating invention, and the remarkable mechanical progress of the age attests to the soundness of that policy. The devices and improvements on devices that have been invented for and adopted by railroads in the last hundred years, have had a tremendous influence upon the efficiency of the present transportation machine, which would not be true if it were not for the right accorded inventors. Continued progress demands this stimulus in the future.

Manufacturers must be reasonable in the exercise of the monopoly afforded by patents, of course, but if a device has merit and will effect a saving, a railroad should be willing to pay a reasonable reward for the inventive mind, industry, experimentation and development that have produced it.

Railroads should watch patent expirations to take

legitimate advantage of the opportunity to put production on a competitive basis. This is entirely consistent with the spirit of the patent law, but even in this case it is obviously unwise to restrict interest to articles on which patents have expired, if improvements have been made which continue to justify a road in paying a higher price than the production of the unimproved articles cost in a competitive market. Patents are not inimical to forward-looking purchasing, and a policy based upon that assumption is apt in the long run to prove penny-wise and pound-foolish.

What Motor Coach Mergers Mean to the Railways

FROM time to time we have pointed out the distinct trend in the field of motor coach transportation toward the consolidation of small and relatively weak companies into larger and more powerful organizations. Highway transportation, insofar as the carriage of passengers is concerned, has ceased to be exclusively a neighborhood institution; instead, with the establishment of several lines running from coast to coast, it has assumed a transcontinental nature. Some of the existing transcontinental systems have been formed through the consolidation of as many as two hundred individual companies, many of them successful and prosperous. What effect may these consolidations be expected to have upon the railways? The first effect is an obvious one. Motor coach lines, particularly those operating over long routes, are direct competitors with the railways for traffic. The first effect of the current consolidations is to strengthen and augment the resources of these competitors. The second effect has not yet become so apparent but it is nevertheless to be expected. The railways which are operating motor coaches or are attempting to secure from the state commissions the necessary certificates permitting such operations, are finding it extremely difficult, if not impossible, to accomplish their purposes over routes already served by independent coach lines. The alternative in such cases is to buy the competing line, thus securing the transfer of its certificate, and several roads are doing this.

At the present time the field of interstate motor coach operation is open to anyone, the railways included, there being no regulation of such service under existing laws. Inevitably, however, there will some day be regulation of the interstate lines. When that day comes the lines longest established on the interstate routes will have the advantage in securing permits to continue operation. What will happen when regulation of interstate lines has become a fact and permissive certificates must be secured before interstate lines can be operated? The railways, in that event, will have the same difficulty in securing certificates for interstate routes that they are now encountering in establishing intrastate routes. The same alternative, that of buying out the existing company operating over the desired route, will then exist, but it will unquestionably prove to be an expensive alternative.

The large motor coach systems growing out of the current consolidations will probably hold the interstate certificates, and it is idle to expect that they will give them up except at a stiff price. The recent statements of several officers of transcontinental motor coach systems relative to this subject indicate that they are awake to these possibilities.

Deficits from Passenger Service

THE losses of passenger traffic which the railways have suffered owing to the competition of motor vehicles have made the passenger train branch of their service probably the most unprofitable large scale business conducted in the United States. Their operating costs and taxes are divided between their freight and passenger train service in accordance with a formula adopted by the Interstate Commerce Commission after long study and many conferences with railway officers. Its Bureau of Statistics recently has submitted to the commission a study in which, using this formula as a measure, it has shown for the railways as a whole, and also separately for those of the eastern, southern and western territories, the net financial results of their rendering of freight train service and passenger train service in 1927.

The figures regarding passenger train service include all the earnings derived from the operation of passenger trains—passenger, mail, express, etc.,—and all the expenses and taxes attributed to the passenger train service. The total earnings derived from passenger train service in 1927 were $1,345,577,000. The operating expenses and taxes assigned to it were $1,315,886,000. The net operating income derived from it was, therefore, $29,691,000. The operating expenses and taxes chargeable to passenger train service were, therefore, almost 98 per cent of the total earnings derived from it, while the net operating income derived from it was only 2.21 per cent of the total earnings.

Total earnings from freight service were $4,789,000,000, the total expenses and taxes assigned to it were $3,750,937,000, and the net operating income derived from it was $1,038,294,000. Therefore, the railways derived about 78 per cent of their total earnings from freight service, there were chargeable to it 74 per cent of their operating expenses and taxes, and they derived from it about 98 per cent of their net operating income. Of course, a large part of the facilities in which their capital is invested are used in rendering passenger service. No formula has yet been adopted for estimating the amount of their invested capital which it should be assumed is used in rendering passenger service. Any seemingly reasonable method that might be used would show, however, that, including capital charges, the railways as a whole are rendering their passenger service at a heavy loss, which is being largely borne by their earnings from freight service. It is not being borne entirely by their earnings from freight service, because the railways are not earning a fair return upon their total investment, and the loss represented by the difference between a fair return and the return actually being earned is being borne by railway owners.

Striking as the foregoing facts are, they tell only a part of the story. The study made by the Bureau of Statistics indicates that the passenger train earnings of the eastern lines in 1927 were $75,450,000 more than the operating expenses and taxes chargeable to their passenger train service. This figure largely exceeds the net operating income derived by the railways as a whole from their passenger train service. The explanation is that the operating expenses and taxes assignable to the passenger train service of both the southern and western lines exceeded the total earnings from it. In other words, both of these groups of roads incurred net operating losses from their passenger train service. The loss of the southern roads was $9,490,000, and that of the western roads $36,270,000. Last year, apparently, was the first in which the southern roads incur-

red an operating deficit in rendering passenger train service; but it was the third consecutive year in which the western lines did so.

The significance of these figures in relation to the continuing agitation for legislation by Congress to abolish the passenger surcharge, and also in relation to proposed legislation to regulate the competition of motor coaches with the railways, should be obvious. In the country as a whole passenger train service is being rendered at a heavy loss, if any reasonable charge for return upon the investment used in rendering it be made against it. The total revenue derived by the railways from the surcharge last year was slightly more than $40,000,000. If they had not received this revenue the passenger train service of the country as a whole would have been rendered at a net operating loss exceeding $10,000,000. The southern and western lines actually did render their passenger train service at a net operating loss. The revenue derived by the southern lines from the surcharge was about $6,300,000, and if they had not received it their net operating loss from their passenger service would have been about $16,000,000. The revenue derived by the western lines from the surcharge was about $16,000,000, and if they had not received it their net operating loss from their passenger service would have been about $52,000,000.

The great decline of passenger earnings which has occured has been due to losses of business handled in day coaches. The general tendency of travel in sleeping and parlor cars, to which the surcharge is applicable, has been to increase. Since passenger service already is being rendered at a heavy loss, especially by the southern and western lines, which receive about 52.5 per cent of the surcharge revenue, it should be obvious that the abolition of the surcharge would be the most completely unjustifiable reduction of railway charges, either passenger or freight, that could be made. The railways as a whole are deriving about 98 per cent of their net operating income with which to pay a return upon their investment from their freight business. The southern and western lines are deriving from their freight business not only all their net operating income with which to pay a return upon their investment, but also the earnings with which they are paying the operating deficits incurred in rendering passenger service. Just how anybody can believe, in these circumstances, that there should be passed by Congress a law which would make railway passenger service still more unprofitable is hard to understand.

The losses of passenger earnings from which the railways are suffering are due mainly to the increasing use of private automobiles, but they are also due in large measure to increasing competition by motor coaches operated on highways constructed and maintained at public expense. There can be no question that the operators of most motor coaches are not paying the public for the use of the highways in proportion to the cost to the public caused by the operation of the motor coaches. Furthermore, companies operating motor coaches are not subject to such regulation of their service and rates as the railways are. Therefore, the railways in their competition for passenger business with motor coach common carriers, are placed at a twofold disadvantage by the government's policy or lack of policy in dealing with the operation of common carriers on the highways. The results are serious to the public as well as to the railways. The commission's Bureau of Statistics estimates that the net operating income derived by the railways as a whole from passenger train service in 1926 was $101,072,000, and in 1927 only $29,691,000, a decline of $71,381,000. This indicates that almost one-half of the $145,000,000, decline in net operating income in 1927 was due to losses of passenger business. The tendency of these losses of passenger business to cripple the railways financially is plain. They cannot be crippled financially without adverse effects being produced sooner or later upon both their freight and passenger service. The public cannot afford to continue to pursue a policy affecting competing transportation agencies which has a direct and manifest tendency to cripple the most important of the country's transportation agencies.

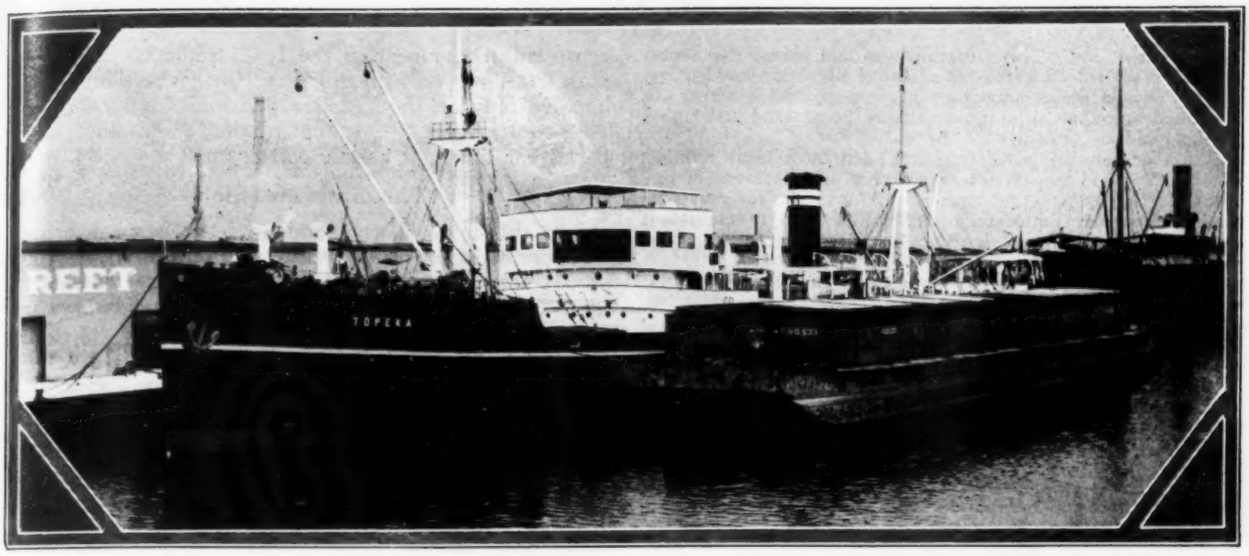
Eliminating Derails at Crossings

IN 1924 the Signal Section of the American Railway Association approved a report recommending that derails should not be used in main tracks. An explanatory paragraph in the report concluded with the statement that it is illogical to install a device to prevent an accident by causing another which may be worse.

The approval of this report crystallized the thought of many railroad officers in favor of eliminating derails wherever possible. This has proved of decided assistance in securing the approval of state commissions for the installation of automatic block signal protection without derails at railroad crossings, known as automatic interlocking plants, for, in at least 12 middle western states, mechanical interlocking plants, with derails, have been replaced by automatic interlocking plants without derails. Installations of this type have been made at crossings on such roads as the Chicago, Milwaukee, St. Paul & Pacific, the Illinois Central, the Chicago & North Western, the Missouri Pacific, the Chicago Great Western, the Great Northern, the Northern Pacific, the Kansas City Southern, the Chicago, Rock Island & Pacific, the Wabash, the Michigan Central and the Chicago & Eastern Illinois. In some cases of a somewhat different character, where it is desired to give preference to trains approaching on certain routes, the signals governing movements over the crossing are controlled by small levers in a station which may or may not be near the crossing. Such plants have been installed, without derails, on the Illinois Central, the Wabash, and the Chicago, Rock Island & Pacific.

Derails have likewise been eliminated at larger plants, as for example, at a plant installed at Walbridge, Ohio, near Toledo, in 1926, involving the crossings of the Hocking Valley, the Toledo Terminal Railway and the Pennsylvania, each of which crosses the other two lines. Several New York Central passenger trains also are operated through this layout on the terminal tracks so that this is a busy plant, handling over 200 and sometimes as high as 300 train movements daily. The plant has now been in service over two years, and no accidents have resulted from the absence of derails. Derails have also been removed at old plants or left off at other crossings, on such roads as the Baltimore & Ohio, the Norfolk & Western, the Erie, the Michigan Central and the Pennsylvania.

At a recent conference of representatives of the twelve roads interested in the Kansas City Terminal, the question arose whether derails should be included in a layout of proposed interlockings including yard connections, crossings, crossovers, etc., and only one road voted in favor of derails. It is, evident therefore, that the belief is growing that the elimination of derails on main lines not only reduces the first cost and operating expense of an interlocking, but also facilitates the operation of the plant, and in a large majority of cases increases rather than reduces the safety of train operation.



Transferring Freight to an Ocean Vessel at New Orleans

What the Barge Lines Are Doing

Past performances and present operations of the Mississippi-Warrior waterways service

Part II

THE barge lines operated by the Inland Waterways Corporation handled 1,650,207 tons of freight in 1927. This represents an increase of 307,651 tons over 1926 and of 507,988 tons over 1925. Traffic on the Lower Mississippi division (the St. Louis-New Orleans line) has shown increases every year since 1918, when the service was inaugurated. The Warrior division (the Birmingport-Mobile line) also showed increases in traffic from 1918 to 1923 inclusive. After a decrease in 1924, increases began again and the 1927 traffic was by far the greatest ever handled on this division. The Upper Mississippi division (the St. Louis-Minneapolis line) did not begin operations until 1926. All of this traffic moves on a rate approximately 20 per cent lower than the equivalent rail rate.

Much bulk freight is handled; but the volume of other traffic is by no means small. This diversity of movement is indicated by a summary of the commodities handled in 1927, shown in Table 1. Sugar was the principal commodity handled, amounting to 450,896 tons, grain was next with 193,059 tons, while 244,844 tons of bauxite ore were handled.

Of the total traffic, 772,473 tons moved southbound, or downstream, while 877,734 tons moved northward. Interline traffic amounted to 856,915 tons, as compared with 793,292 tons of local traffic.

It will be observed that no lumber is handled on the Mississippi, despite the fact that this commodity forms a large percentage of the traffic handled by the railways with which the barge lines compete. There are also several other commodities, such as hay, which it is not deemed expedient to handle by barge.

Since the usual condition is that the barge lines are offered more freight than they can handle, the traffic is loaded on a space allotment plan. Some of the shippers using the barge line have made quite bitter complaints regarding discrimination in space allotment. Perhaps the best description of this condition and the steps that were taken to meet it is given in General Ashburn's annual report for 1927, as follows:

Table 1. Character of Traffic Handled, 1927
(Tons of 2,000 lb.)

	Lower Mississippi Division	Upper Mississippi Division	Warrior Division	Total
Grain	187,680	5,379		193,059
Products of agriculture	11,682			11,682
Tobacco	25,974			25,974
Cotton	61,253		20,141	81,394
Coffee	15,211		381	15,592
Sisal	14,251	1,330		15,581
Animal products	3,072			3,072
Bauxite ore	244,844			244,844
Bauxite ore concentrates	17,582			17,582
Steel and iron products	43,582	467	57,868	101,917
Manganese ore			29,423	29,423
Coal			75,410	75,410
Other products of mines	3,177			3,177
Forest products	3,272			3,272
Sugar	376,323	2,924	71,649	450,896
Automobiles	1,414			1,414
Bagging and burlap	12,032			12,032
Lumber			4,299	4,299
Canned goods	29,336			29,336
Paper and paper stock	6,353			6,353
Flour and other mill products		492		492
Agricultural implements		999		999
Salt			3,821	3,821
Sulphur			21,035	21,035
Crushed rock			52,823	52,823
Cement			37,006	37,006
Miscellaneous	180,414	2,470	24,838	207,722

"In the spring of 1927 very definite complaints to the effect that discrimination was being made in the port of New Orleans, resulting in the favoring of one group of shippers over another, were brought to my attention. The western sugar refiners and the Hershey refiners definitely charged that the New Orleans refiners were being favored

by our barge line. This situation was laid before the Secretary of War, who decided, as a matter of policy and equity, that if any such discrimination in fact existed it should be abolished and that all shippers should be given equal rights to the facilities afforded by the barge line.

"At a conference which was attended by a large number of our shippers, request was made that an allocation of our available barge space be made, to apply in the future. Our traffic department undertook and did give to my assistant figures which purported to represent probable future offerings of freight that might be expected from those shippers who were not present at the conference, and the representatives of those shippers who were present presented their figures as to probable future offerings. There was thus presented a peak demand for space for grain southbound and a peak demand for sugar, bauxite ore and sisal northbound.

"Based on the figures thus secured, an allocation of space was presented for my approval. Believing that in every respect the matter had been competently handled in accordance with the policy outlined by the Secretary of War, this allocation was approved and, presumably, made effective. Such was not, however, the case, and it was not long before the matter again came before me with definite facts indicating that the allocations were based upon figures purporting to represent the offerings of those shippers who had not been present at the conference, which could not be sustained, that these unrepresented shippers felt that they had been ignored, that the allocations had been arbitrarily violated by our service, and my assistant himself reported that he felt that he had not been properly informed by our line officials as to the actual facts."

Solicitation of Traffic

Freight solicitation is in charge of a traffic manager, with headquarters at St. Louis, who is also operating manager of the Lower Mississippi division. Off-line agencies are maintained at Birmingham, Ala., Chicago, Cincinnati, Ohio; Dallas, Tex.; Houston, Los Angeles, Cal.; and San Francisco. The additional solicitation offices on the lines are at Memphis, Tenn.; Minneapolis, Minn.; Mobile, Ala.; New Orleans, La.; St. Louis, Mo.; and St. Paul, Minn. To a large extent, the solicitation personnel consists of former railway traffic solicitors, and the methods used are similar to those in effect in railway traffic solicitation.

The activities of the outside agencies are being broadened, as indicated by the fact that the expense of maintaining such agencies was $141,862 in 1927, as compared with $106,733 in 1926. The total traffic expense was $277,679 in 1927, and $222,762 in 1926, an increase of $54,917 or 24.6 per cent. The items of superintendence and tariff publication show increases, but the principal increase resulted from enlarging the scope of the outside agencies.

Traffic Comparisons

For the purpose of comparison of barge line traffic with rail traffic, the Illinois Central has been selected, since it serves the same general territory as that served by the barge lines. The following comparisons are based on the 1927 traffic. Fifty-three per cent of the barge line traffic consists of three commodities, sugar, bauxite ore and concentrates and grain. Sugar constitutes 27 per cent of the total traffic handled, as compared with just under 1½ per cent on the Illinois Central. Bauxite ore and concentrates constitute 15 per cent, while the quantity of this traffic handled on the Illinois Central is less than half of one per cent. Grain accounts for another 11 per cent, as compared with approximately 4.5 per cent on the I. C. Cotton accounts for 4 per cent on the barge lines, and just under one per cent on the I. C. Coal and coke constitute 36 per cent of the traffic handled by the I. C., whereas, the barge line does not handle coke, and coal is handled only on the Warrior division, representing 4 per cent of the total traffic. Forest products, including lumber, represent 13 per cent of the I. C. traffic, as compared with 0.004 per cent on the barge line, where lumber is handled only on the Warrior division. Refined petroleum constitutes 6.81 per cent of the I. C. traffic. The barge line does not handle petroleum.

The Rate Situation

The through rail-water rates of the barge line are, in general, based on 80 per cent of the divisions that would accrue to the rail lines for the same haul. An amendment to the Denison bill makes it mandatory that railways join the barge lines in through rates. This clause reads as follows:

"Any person, firm or corporation engaged or about to engage in conducting a common-carrier service upon any of the navigable waterways of the Mississippi river, its tributaries, or connecting waterways, may apply to the Interstate Commerce Commission and upon a hearing and a showing as required under Section 1 of the act to regulate commerce, obtain a certificate of public convenience and necessity, and the Interstate Commerce Commission shall thereupon by order direct all connecting railroads and their connections to join with such water carrier in through routes and joint rates as provided in Subsection 3 of Section 15 of the act to regulate commerce, as amended, and the commission shall in such order fix reasonable differentials between all-rail and joint-rail-and-water rates to apply until changed by order of the commission."

There has always been some confusion as to the establishment of through rates in connection with the barge lines. The railways have, naturally enough, objected to being short-hauled. However, General Ashburn, the head of the Inland Waterways Corporation, has made the following statement:

"We have been able, through our relations with the railroads, and through their co-operation (some of them very strong in their co-operation) to extend the benefits of cheap rates to 42 states." (Proceedings of National Rivers and Harbors Congress, 1926, p. 56).

At the annual meeting of the Chamber of Commerce of the United States held in New York, May 8, 9 and 10, 1923, C. H. Markham, then president of the Illinois Central, expressed the following views for the Illinois Central in the establishment of joint rates: "I am not opposed to water transportation wherever it can be justified on the basis of economy and practicability. In order to assist in determining the advisability of using the lower Mississippi river the Illinois Central has cooperated heartily with the officials of the War Department in the experiment which they have been making since 1918. If the experiment should eventually prove the wisdom of using the river for transportation, we believe the Illinois Central ought not to be barred by law from putting boats on the river and operating them in conjunction with its services by rail. That would be carrying out both the spirit and the letter of co-ordination."

The Interstate Commerce Commission has favored the establishment of joint-rail-barge rates, the division allotted the barge line being on an approximate 20 per cent differential under the corresponding rail rate. The Commission's views on the subject are contained in the record (Vol. 77, p. 317) of the now famous case: United States War Department, Inland Waterways, Mississippi Warrior Service versus Abilene Southern Railway Company, et al.

On at least two occasions, the commission has reversed the adverse findings of its own attorney-examiners and ordered the installation of through rates against the recommendation of the attorney-examiners. In the case of through freight routes and joint rail-barge rates from Chicago to Minneapolis and St. Paul, Attorney-Examiner John H. Howell recommended the dismissal

of the corporation's complaint, giving the following as his reasons:

"The barge line is not interested in reasonable rates, but only in rates made sufficiently lower than the existing rail rates to enable it to secure traffic. Giving full consideration to the desirability of fostering water transportation to the maximum degree consistent with sound economy in transportation, the question arises whether the proposed operations of the barge line will be economical. In determining this, the evidence presented by the barge line is not helpful. "From the point of view of the rail carriers, the effect of the barge line's proposals is that they maintain their facilities to the same extent as at present; that they continue to handle the traffic, which because of its nature or because of the lowness of the rates, is not desired by the barge line; that during the winter months, when transportation conditions are the most difficult, they handle the entire volume of traffic; and that on traffic interchanged with the barge line they accept divisions which appear hardly adequate for the service they would be called upon to perform."

The commission, however, disagreed with its attorney-examiner's findings, and ordered the railways to put in the rates.

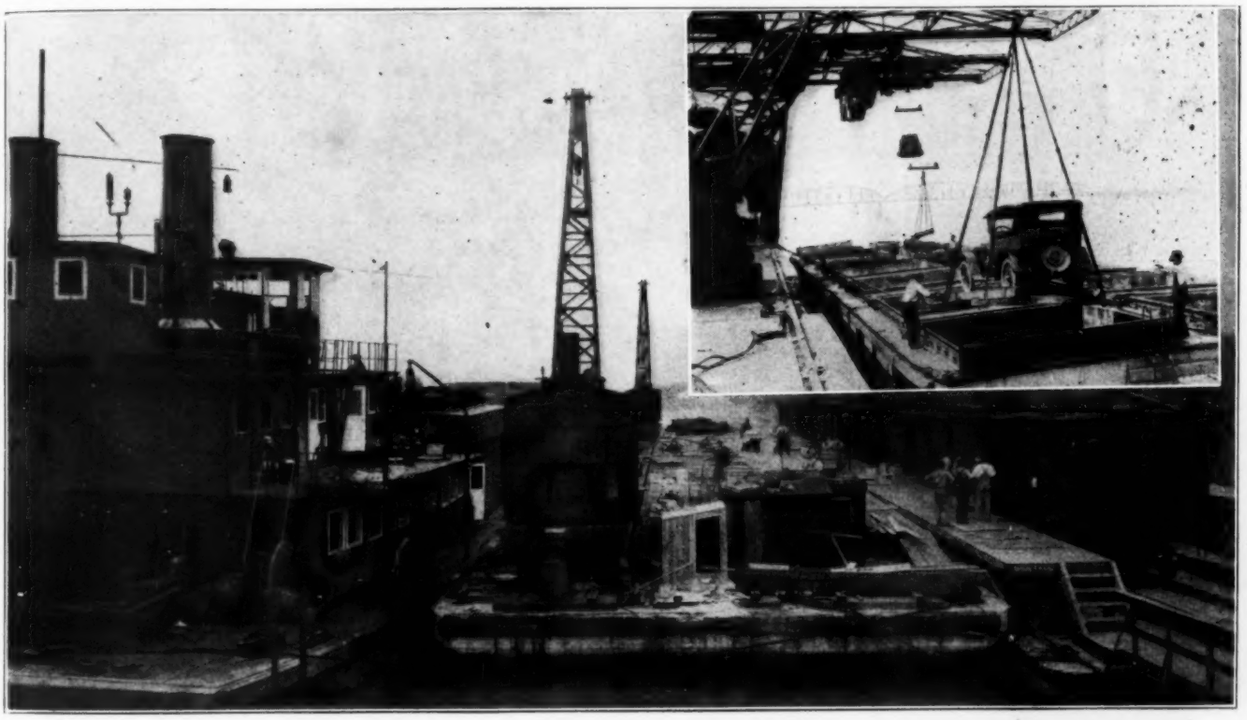
In this case, the Illinois Central adopted a neutral stand, while the other Chicago-St. Paul lines involved protested vigorously against the new rates. Their contention was that, with the necessary terminal charges, and the short haul, the barge lines could not hope to make a profit, and that the only result would be a diminution of the railway revenue. They maintained further that their present service would have to be maintained, despite the loss of tonnage and revenue. A study made by the Chicago Great Western during a three-month's period showed that this company received $48,084 for the carload and less-than-carload traffic involved in the proposed joint rate, while under the interchange asked for, only $19,527 would accrue to it for the haul from Chicago to Dubuque, or $28,557 less than it had been earning. For the year this loss would approximate $100,000.

In the establishment of port-to-port rates, the corporation is, of course, free to establish any rates it may desire without reference to the commission and also without reference to such corresponding rail rates as may exist.

Financial Results

The following figures and tables, showing the financial results for the first 10 years of the operation of the barge lines, are taken from the annual reports of the Inland Waterways Corporation and its predecessors.

The tonnage handled, revenue, operating cost, depreciation and deficit since the barge lines were inaugurated in 1918, are shown in Table 2. It will be observed that the operating revenues have been increasing at the rate of nearly one million dollars per year since 1923. However, the operating costs have also shown increases, having been $3,367,814 in 1923 and and $5,774,462 in 1927, an increase of $2,406,648. This compares with operating revenues of $2,846,485 in 1923 and $6,159,431 in 1927, an increase of $3,312,946. The total operating deficit since 1918 for the three divisions amounts to $5,162,142. This does not include the deficits incurred by the Warrior River Terminal Company, a railroad



The Crane Barge, Track Barge and Incline at East St. Louis, Ill. Inset: Loading Automobiles at the St. Louis Dock

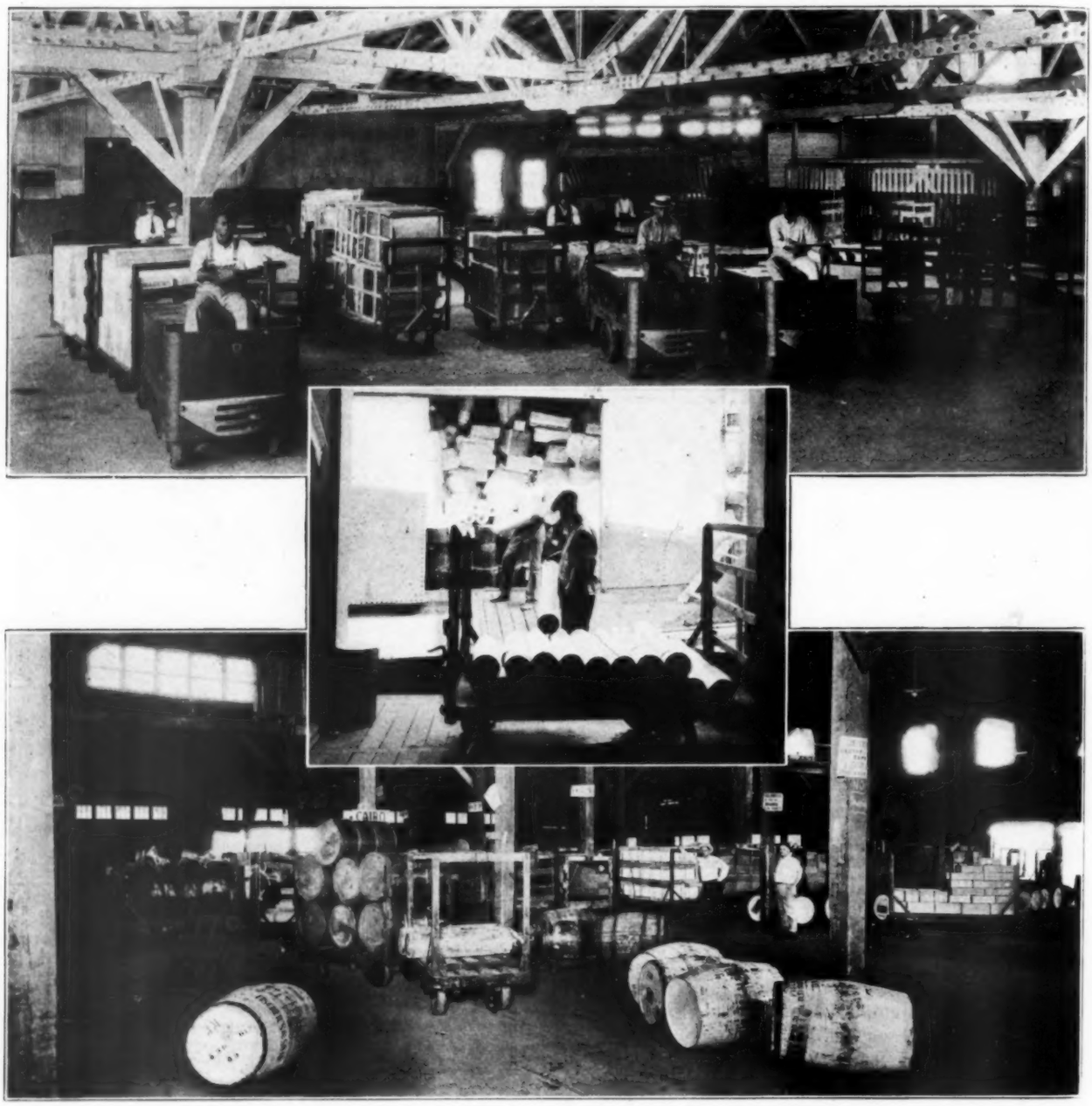
Table 2. Tonnage, Earnings and Expenses, Mississippi Warrior Barge Service, 1918-27

Year	Tonnage	Revenue	Operating Cost	Depreciation	Operating Loss Including Depreciation
1918	33,728	$86,083	$214,390	$6,481	120,294
1919	235,271	601,820	1,282,466	75,767	756,412
1920	360,719	1,082,405	2,028,610	221,097	1,177,301
1921	672,111	2,256,967	2,523,355	509,768	776,156
1922	860,013	2,758,223	3,326,544	428,078	996,399
1923	979,772	2,846,485	3,367,814	434,030	955,359
1924	1,071,848	3,503,751	3,683,084	353,275	532,618
1925	1,142,219	4,010,095	3,711,904	332,710	34,559
1926	1,342,556	5,184,882	4,620,527	351,156	213,199*
1927	1,650,207	6,159,431	5,774,462	406,776	21,807
	8,348,444	$28,490,142	$30,533,156	$3,119,138	$5,162,142

* Operating Income.

owned by the corporation, nor does it include the expense of the administrative office of the corporation in Washington.

Claims paid on account of loss and damage to freight amounted to $170,205 in 1927, while damage to property amounted to $23,109. Personal injury claims, which are settled and paid for by the United States Compensation Commission amounted to $12,364.



The Freight House, Equipment and Methods of Handling at Memphis, Tenn.

The operating expenses for 1927 are divided into five general classifications as follows:

Maintenance	$1,507,740
Traffic	277,680
Transportation	4,007,935
General Expenses	282,241
Charter Expenses	70,507
Total	$6,146,103

Maintenance expenses are subdivided as between maintenance of equipment, amounting to $1,209,400, and maintenance of terminals, $298,337; transportation expenses are similarly subdivided between operation of vessels, $1,684,566, and the operation of terminals, $2,117,715.

Results Since Corporation Was Organized

Major General Ashburn believes that the success or failure of the waterways plan should be judged by the results obtained since the Inland Waterways Corporation was organized. His arguments in this connection are interesting and pertinent, and they are given below:

"In making a public statement concerning the operations of the Inland Waterways Corporation, even its opponents, in all candor, ought to admit that its results should be judged from the creation of the corporation, and the first real opportunity of the government to demonstrate what it set out to prove, and not by results prior to its organization.

"The fleets, created as a war time measure, were a hetero-

geneous collection of misfits, and the installation of wooden barges on the Warrior a gross mistake. Many mistakes were made. It was a new and untried field of transportation. Nothing like it—a great common carrier co-operating with the railroads—had ever existed. Even the rate adjustments put into effect in the closing days of the railroad administration were plainly calculated to destroy the efficiency of the then existing organization, and to prevent the accomplishment of the object now being actually achieved, furnishing the public, through co-ordinated rail and water transportation, a cheaper freight rate than the all-rail rate, with a living revenue for the participating carriers. Why not let the demonstration be argued on the basis of the accomplishment of a highly organized efficient machine, such as now exists, without attempting to obscure the issue by harking back to the results accomplished first, as a war measure, and second, by an organization so handicapped by laws, rules and regulations that efficient operation was impossible?"

The corporation took over the operation of the barge lines in July, 1924, during which year the operating loss amounted to $532,618. This loss, however can not be attributed in its entirety to the corporation, and since there is no feasible means of making a fair distribution of the loss, it is not given in the table.

Table 3. Results Since Corporation Was Organized

Year	Tonnage	Revenue	Operating Cost	Depreciation	Operating Income
1925	1,142,219	$4,010,095	$3,711,904	$332,710	$34,559*
1926	1,342,556	5,184,882	4,626,527	351,156	213,199
1927	1,650,207	6.159,431	5,774,462	406,776	21,807*
1928 (Seven Months)	999,877	3,839,934	3,445,835	264,701	129,398
	5,134,859	$19,194,342	$17,552,728	$1,355,343	$286,271

* Operating Loss.

Analysis of Results

The corporation does not indulge in detailed cost accounting so that it is impossible to arrive at exact conclusions as to costs. However, upon one occasion, the average revenue was figured at $3.75 per ton by the barge lines. The regular service provides for 17th morning delivery at St. Louis from New Orleans for the towboats. Omitting from consideration, for the moment, all but actual running expenses, it will be seen that the wages of the 31 men who constitute the crew of each towboat amount to a considerable sum in a 17-day period. Moreover, a large expenditure for fuel is necessary to fight the Mississippi current for 17 days. When there is added to this, the heavy expenses of trans-shipment of freight at terminals, it is readily understandable why the operating expenses have mounted rapidly as the tonnage handled has increased. Moreover, there is no ground for believing that the developments of past years will not be repeated and that any further increase in traffic will not be accompanied by a further proportionate increase in operating expenses.

Professor Harold G. Moulton, formerly of the department of political economy, University of Chicago, and now director of the Institute of Economics, Washington, D. C., has recently completed a thorough study of the practicability of inland waterway transportation. As a result of this study he maintains that a careful analysis of complete costs will show that rail transportation is more economical than that on inland waterways. He also points out two important features not ordinarily taken into account in the arguments of waterway advocates. One is that their arguments are invariably general in their scope and unsupported by cost analysis. The other is that waterway costs must necessarily include the fixed charges in waterway improvements and also the maintenance costs, which is rarely done, and certainly not by the Inland Waterways Corporation.

For the purpose of analyzing the financial results, one may favor the waterways by omitting entirely the gifts from the shipping board, the traffic surveys made by the Transportation division of the Department of Commerce, the payment of claims by the compensation board and other benefactions. Nor is it the intention here to go into the matter of fixed charges, such as the interest on the investment in equipment or in waterway improvement and maintenance, beyond mention of figures quoted by C. A. Newton, general counsel of the Mississippi Valley Association, who, when appearing before a House committee in support of the Denison bill, stated: "We have already expended $250,000,000 on these inland-river channels. I should say that some sixty million dollars more will complete all channels."

Examining the figures, without reference to the factors mentioned in the preceding paragraph, it will be seen that in 10 years, the barge lines have carried 8,348,444 tons of traffic on which the railway earnings would have been approximately thirty-four million dollars. In accomplishing this, they have incurred a total deficit of over five million dollars in operating expenses and depreciation alone.

Future Developments

The Denison bill not only provides for the increase in the capital stock of the corporation from $5,000,000 to $15,000,000, but it also provides for the future development of the barge lines. This is contained in Sec. 3, paragraph (b) of the bill, which reads as follows:

"When the improvement of any tributary or connecting waterway of the Mississippi river shall have been advanced to the point where, within two years thereafter, there will be completed a sufficient and dependable channel for the safe operation of suitable barges and towboats thereon; and when the chief of engineers of the United States Army shall so advise, and certify that fact to the Secretary of War, the Secretary of War shall thereupon cause a survey of such tributary or connecting waterway to be made for the purpose of ascertaining the amount of traffic, the terminal facilities, and the joint traffic arrangements with connecting carriers, that are or will, within such period, probably be available on such tributary or connecting waterway. As soon as such survey shall have been completed the Secretary of War shall make a report thereof to Congress with his recommendation as to whether or not in the public interest the service of the Inland Waterways Corporation should be extended to such tributaries or connecting waterways."

The transportation division of the department of commerce has recently undertaken two surveys of inland waterway transportation for the Inland Waterways Corporation. The first of these comprised a 90-day traffic survey of the Mississippi and Warrior river territories to ascertain present and future offerings of cargo. The report of this survey indicated that, whereas 1,251,276 tons of cargo were carried by the lower Mississippi division in 1927, if equipment had been ample and services satisfactory, 6,995,424 tons might have been available. In the Warrior river territory, 396,000 tons were transported in 1927, as against a potential offering of 1,442,652 tons. The transportation division is also engaged in making a survey of the available traffic on the Missouri river between Yankton, S. D., and St. Louis, Mo., preliminary to establishing water transportation for that area.

The passage of the Denison bill indicates that it is the intention of the government to continue indefinitely the experiment in inland waterway transportation. The results so far obtained are not such as would attract private capital to the enterprise. Evidently, however, it is believed that by spending more money and extending the field of activity, the experiment may yet be made a success.

Pennsylvania to Electrify 1,300 Miles of Track

GENERAL W. W. Atterbury, president of the Pennsylvania Railroad, on November 1, made an announcement as follows:

"The board of directors of The Pennsylvania Railroad Company has authorized the electrification of the entire road train service, freight and passenger, between New York and Wilmington, Delaware.

"This authority covers part of a plan which includes also electrification of the grades between the Susquehanna, Schuylkill and Delaware River valleys and our eastern terminals.

Route Mileage Is 325

"The project as now announced covers the passenger and freight service on 325 miles of lines and 1300 miles of track beginning at Hell Gate Bridge, New York, where connection is made with New England, and extending west and south to Wilmington, Del., west from Philadelphia, Pa., on the main line in the direction of Harrisburg as far as Atglen, Pa., and the low grade freight lines which join at Columbia, Pa., and connect the cities of New York, Philadelphia and Wilmington with the West.

"This electrification will far exceed in magnitude and in importance that of any other railroad in the world, in miles of track to be electrified, in volume and density of passenger and freight business handled, in size and amount of equipment required, in the number of trains affected, and in terminal operations involved. The project will be undertaken progressively in sections and extend over a period of years.

Estimated Cost of Work

"It is estimated that the cost of this electrification will be approximately $100,000,000 to be spent, however, during the next seven or eight years at the rate of about $15,000,000 per year; sixty per cent of the total being for catenary, transmission line and sub-station construction, and forty per cent for rolling stock. This will be a normal percentage of Pennsylvania Railroad improvement expenditures, which have been averaging $70,000,000. a year; a reasonable portion of which has always been provided out of surplus earnings. These proposed capital expenditures for electrification will make unnecessary certain other capital expenditures on this section of the railroad which would have to be made unless electrification is carried out.

"The authorization of the board of directors to inaugurate this work follows exhaustive studies of the whole industrial and transportation situations in the eastern part of the country, including the terminal developments already under way or projected for Philadelphia, Pa., and Newark, N. J. While this analysis was worked out in detail on the basis of the traffic estimated for the year 1935, the probability was not lost sight of that by 1950 the metropolitan area around New York would extend to New Brunswick, N. J., on the west and well out on Long Island on the east and contain 30,000,000 people, and that there would be similar development in other cities.

"The system adopted will be such that it will, by the simple addition of increased power and increased rolling stock, handle a movement of any magnitude which it is possible to handle over the existing tracks and at such speed, within the bounds necessary for safe operation, as the demands of the traffic may require from time to time.

"The immediate factors which influenced the decision to proceed with electrification at this time were as follows:

1—The greater economy of electric traction as compared to steam operation in dense traffic territories; 2—The growth of the southern passenger business; 3—The increasing density of both freight and passenger business on our eastern lines and the probability that in the future more rapid movement would be required; 4—The desirability of utilizing the advantages of electric traction in connection with the construction of our new passenger terminals at Philadelphia, Pa., and Newark, N. J.; 5—The desirability of building a locomotive that would meet the requirements from the standpoint of weight of train, speed, and reliability that we believe will have to be met in this territory in the next twenty years; 6—The probability that the project, if started now, would be completed with a less total expenditure, all matters considered, than if started at a later date.

"Among the more important details of construction and operation which are involved in this project, are the following, which are of possible interest to the public:

"We intend to use the alternating current single phase system of electric traction, similar to that now in use in our Philadelphia suburban service, because we believe it the best adapted for heavy traction trunk line service. Our engineers studied this system abroad a number of years ago and in anticipation of the future we have been working on its development ever since. It is now used extensively in Germany, Switzerland and Sweden, and in this Country on the New Haven, Norfolk & Western, and Virginian Railways.

"In suburban service we will use multiple unit cars similar to those in the subways of New York and Philadelphia and those at present in use on our Philadelphia suburban lines, because they are more desirable from the standpoint of rapid transit on runs where frequent stops must be made.

"The through freight and passenger service will be handled by electric locomotives because they handle that kind of service best.

"With the assistance of the electric companies we have developed three types of electric locomotives which when used singly or in multiples as required will provide any power demanded by size, weight of trains, or speed. They are so designed as to permit the maximum interchangeability of parts, the minimum cost of maintenance, and the simplest and most direct methods of manufacture.

"By the method of operation proposed we expect eventually to reduce the number of freight trains fifty per cent for a given car movement and increase the speed to any reasonable extent required. This of itself provides for a 100 per cent increase in capacity in so far as freight movement is concerned.

"In the case of passenger trains, we expect to eliminate all double heading and most, if not all, of the second sections of trains and avoid the possibility of rough handling due to limited starting capacity, all of which make for greater comfort, better service, and increased capacity of the line.

"The rest of the details are relatively minor and, while they have been fully worked out, are more or less subject to change dependent on the development of the art between now and the time each expenditure is made."

The Economics of Car Retarders*

A saving of 13 cents per car humped made possible by an installation in the Hartford, Conn., yard of the New York, New Haven & Hartford

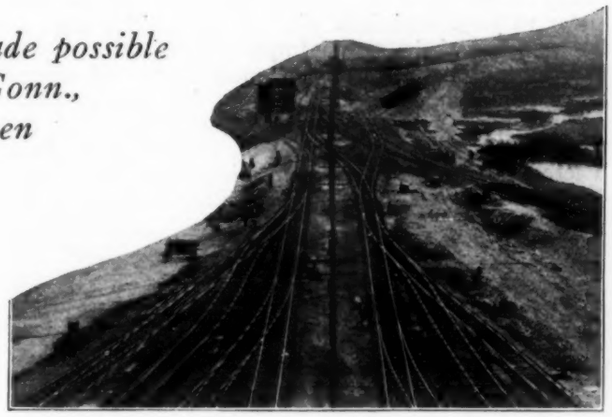
By Kent T. Healy

Assistant Professor of Transportation, Yale University

and

P. H. Jacobs

Strathcona Fellow, Yale University



View Looking from the Yard Up the Hump

LATE in 1925, the Hartford yard of the New York, New Haven & Hartford was placed in service as a hump classification yard, replacing smaller flat yards at Hartford and East Hartford. The usual summer and winter humps and 19 classification tracks were provided, the cars being handled by riders down the hump to their final position. A speeder car, used to return the riders to the hump, was operated on a track temporarily placed alongside the yard. The switches for routing the cars were operated by three men. The traffic was such that the humping could be done in two shifts with from five to nine riders. With these facilities, a maximum of 505 cars were handled in a single shift in 348 cuts.

In October and November, 1926, power machine switches and car retarders were in service at the Hartford yard. Six additional tracks, making an east group, were added at this time, but only one pair of double retarders on the lead was provided for them. In all, thirty-five 33-ft. and two 40-ft. retarder units and 24 skate machines were installed. The control for these and the switch machines was placed in two towers, the one near the hump having levers for 10 switches and 11 retarders, and the other having levers for 22 switches, 26 retarders and 24 skates. With these facilities the operation of the yard was put on a three-shift basis, together with the consolidation of the hump engine work with the work of the engines in the classification yard, and with the withdrawal of the hump engines previously employed. The subdivision of the traffic into three shifts distributed the load on the equipment more evenly, and during the period under consideration, the maximum shift put only 438 cars over the hump in 319 cuts. This arrangement expedited the movement of the cars and made for quicker connections with outgoing trains, and earlier placement of cars in the terminal.

Time Studies Made of Operation

A survey of the actual operation with retarders, as compared with riders, showed that the last seven months of rider operation and the last seven available months of retarder operation, should be used for any comparison in order to eliminate unusual conditions which were present in both instances during the introductory periods of operation. Care was taken to get a basis for comparison that would be free from the influence of factors other than the riders and hand switches, as compared with the retarders and machine switches. The other factors which it was hoped to eliminate in particular were variations in the density of traffic, and differences in general methods of yard operation with variations in the utilization of hump engine crews during spare time. This led to the choice of analysis of the time taken in actually classifying cars, which meant the time from the moment the first car was on the crest of the hump until the last car had left the hump. The result of this study is averaged for different months in Table 1.

Table 1—Distribution of Time Going Over the Hump, Prorated on a Car Basis

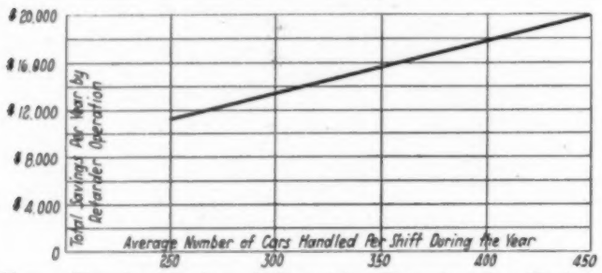
	Hand Switch and Rider Operation, 1926 Time Going Over Hump			Machine Switch Retarder Operation, 1927 Time Going Over Hump
	Time in Motion Per Car	Time Waiting For Riders Per Car	Total Time Per Car	Time in Motion Per Car
March	29 sec.	12 sec.	41 sec.	32 sec.
April	21 sec.	21 sec.	42 sec.	30 sec.
May	20 sec.	22 sec.	42 sec.	30 sec.
June	29 sec.	24 sec.	53 sec.	30 sec.
July	27 sec.	25 sec.	52 sec.	30 sec.
August	24 sec.	28 sec.	52 sec.	30 sec.
September	23 sec.	27 sec.	50 sec.	29 sec.
Average	25 sec.	22 sec.	47 sec.	29 sec.
Average cars per cut	1.46			1.44

It will be noted from the table that, with rider operation, almost half the time charged to actual humping operation was consumed in waiting for riders. This, of course, was due to the fact that there was not sufficient business to warrant working other than a minimum number of riders, and the traffic requirements necessitated operation during a 16-hour period. As far as the number of cars is concerned, they could be switched in an eight-hour shift with the proper number of riders, but this would not have met the traffic requirements. If the management had intended to use car riders over the hump instead of retarders, a speeder car track with tunnels would have been constructed in the middle of the yard, which would have improved the record during the period of rider operation.

It is to be noticed that the time in which the cars are actually in motion is of the same order with both

* See also article on Page 22, of the *Railway Age* for July 7, 1928.

types of operation. The limiting feature of the retarder operation seems to be the capacity of the last tower operator to handle the large number of switches, retarders, and skates assigned to him. The trimming time was higher with retarder operation because of difficulty in getting the cars rolled into their final position under varying conditions with all the braking done at the head end of the yard. Improvement in this respect can be expected through the maintenance of proper grades to permit the cars to go to their resting place without the necessity of heavy retardation. For the needs of maximum capacity of the railroad as a whole, where the costs of the classification were subordinate to the over-all costs, speeds of classification could be in-



Curve Showing Savings Effected by Retarders for Various Numbers of Cars Handled

creased by employing more riders or increasing the number of control towers. The saving of time in shoving over the hump amounts to about 38 per cent for retarder operation as compared to rider operation. This, of course, is reflected in less humping engine time and faster movement through the yard.

Comparison of Results Accomplished by Each Man

With rider operation, experience showed that under ideal conditions the switchmen could handle a cut every minute, or about 460 cuts per eight-hour shift, with 20 min. for meals. With the average of 1.46 cars per cut, this was equivalent to 670 cars per trick or 734,000 cars per year. The number of cars that could be handled by each rider in a single shift varied from a monthly average of 48 to 57, with an average of from 33 to 39

Table 2—Analysis of Accidents During Classification for Nine Months

	Car Rider and Hand Switch Operation	Car Retarder and Power Switch Operation
Switch failures	1	1
No riders on hand	2	0
Brake failures	7	0
Gained speed after retarded	0	7
Defective hopper	0	4
Cornering, side-swiping	2	11
Derailments	2	3
Unreported	29	5
Rider brake inadequate	16	0
Retardation inadequate	0	9

cuts in the seven months considered. In the winter months previous to this period, the average was 35 cars in 25 cuts, but this figure can hardly be considered indicative of winter operation because these months formed the preliminary period. The average number of cars handled per rider over the whole period was 52.

With retarder operation, the switchmen and riders were replaced by tower operators. For such numbers of cars as have been handled in any single shift so far, two tower operators have been sufficient, but with considerably higher traffic another tower might prove necessary. With machine switch operation alone, the control could be consolidated in a single tower under one man as is usual in other yards. Initially, the maintenance of the retarders has required a signal maintainer in each shift, with two helpers during the day to assist in the heavier work. With machine switch operation alone, it is likely that the services of only one general maintainer per shift would be used.

A Reduction in Charges for Accidents

A study of the two methods of operation with regard to accidents to cars in the course of classification led to an interesting analysis, summarized in Tables 2 and 3.

Table 3—Analysis of Approximate Cost of Damage to Cars During Classification for Nine Months

	Car Rider and Hand Switch Operation	Car Retarder and Power Switch Operation
Derailments	$194	0
Brake failures	$426	0
Gained speed after retarding	0	$356
Rider braked inadequately	$3,260	0
Retarded inadequately	0	$305
Cornering sideswiping	0	$155
Unreported	$508	$200
Others	$174	$90
Totals	$4,562	$1,106

Maintenance Costs and Economics of Operation

The maintenance history of the retarders is best shown by the material charges made each month for renewals on the various machines. Table 4 is a summary of these items.

Table 4—Cost of Retarder Maintenance Material

Month	Number of Retarder Shoes	Retarder Shoes	Oil	Shoe Beams	Skate Clips	Chairs	Misc. & Store Expense	Total
March	9	$18	$15	$49	...	...	$17	$99
April	45	90	...	74	...	$50	64	278
May	46	92	21	98	...	33	62	306
June	79	158	25	74	$60	50	284	651
July	186	372	19	...	90	...	171	652
August	216	432	24	49	30	99	167	801
September	...	...	27	...	30	165	39	261
Average	...	...	22*	49	30	57	115	

* Estimated with April item at average.

The item of retarder shoes is not indicative of the trend of the number of renewals or the costs involved, because during July, in the period considered, a change from cast-iron to steel shoes was begun and the final pricing of the steel shoes was held in suspense. The experience with the steel shoes so far seems to indicate a threefold increase of life as compared to cast-iron. The item of shoe renewal can be estimated at about $100 per month on an average, thus giving an average of $475 per month for maintenance material costs, or about $13 per retarder per month.

The maintenance material for the machine switches is included under the item of miscellaneous expense and can be estimated at $50 per month, or about one-tenth of the total maintenance cost. The larger items of maintenance which have not appeared yet, and which are more in the nature of renewals, will be included under fixed charges.

A Comparison of Three Methods of Operation

A thoroughly reliable study of the economics of the installation of machine switches and retarders is an extremely difficult undertaking. It involves not only a comparison of direct expenses such as labor, material and capital charges for the switch and retarder operation itself, but also an analysis of the effects on the utilization of general yard facilities and the operation as a whole, both as to operating and capital charges.

The expenses involved are the labor charges, the material charges, and the capital charges for the three ways of operating with hand switches and riders, and with machine switches and riders and with machine

switches and retarders. The labor charges, which vary with the different methods, are shown in Table 5, subdivided between those that are fixed, regardless of number of cars handled, and those that vary with the number of cars.

Table 5—Labor Costs in Humping

	Daily Wage	Hand Switches and Riders	Power Switches and Riders	Power Switches and Retarders
Fixed Costs Per Year (Three-Shift Operation)				
Switchmen	$5.07	(9) $16,655	.....	.....
Tower operators	$7.94	.....	(3) $8,694	(6) $17,388
Maintainers	$6.24	.....	(3) 6,833	(3) 6,833
Helpers	$4.16	.....	.....	(2) 3,037
Field men	$6.62	.....	.....	(3) 7,249
Speeder operator	$4.88	(3) 5,344	(3) 5,344	.....
Complete engine crews, including conductor & brakeman for humping & classification	$27.26	(5) 52,165	(5) 52,165	(3) 29,850
Total		$74,164	$73,036	$64,357
Variable Costs Per Car				
Riders	$6.62	.13	.13	.....

The cost of riders per car was based on the average of 52 cars per rider. The number of engine crew shifts for the different methods of operation was based on the present practice and the number of additional engines which would be necessary if rider installation were to be resumed. This would mean an addition of two engine crew shifts or the saving, by speeded-up humping, of two out of five shifts. This 40 per cent saving was checked by the 38 per cent saving shown in the time studies which, augmented by the better utilization of locomotive time by combining humping and classification work, would justify the saving shown.

The cost of operation of the switching locomotives was considered on a shift basis; with $14.12 for fuel; $11.52 for repairs, both running and classified; $0.80 for lubricants, water, etc., and $4.50 for enginehouse expenses. These totaled $53,728 per year for rider operation and $32,267 for retarder operation. These locomotive costs were considered fixed over the range of traffic studied, because the number of locomotives was not varied with the traffic, though a varying amount of their time was assigned to other work as traffic allowed. At best, the use of these costs, either as fixed or variable, was found to have some inconsistencies which were impossible to control.

The maintenance material expense for the retarders was assumed to vary with the number of cars retarded, and the major items involved those parts which wear in proportion to the amount of use. With an average of about 23,000 cars handled per month for the seven months considered, this amounts to two cents per car, with $460 total yard costs per month for that traffic.

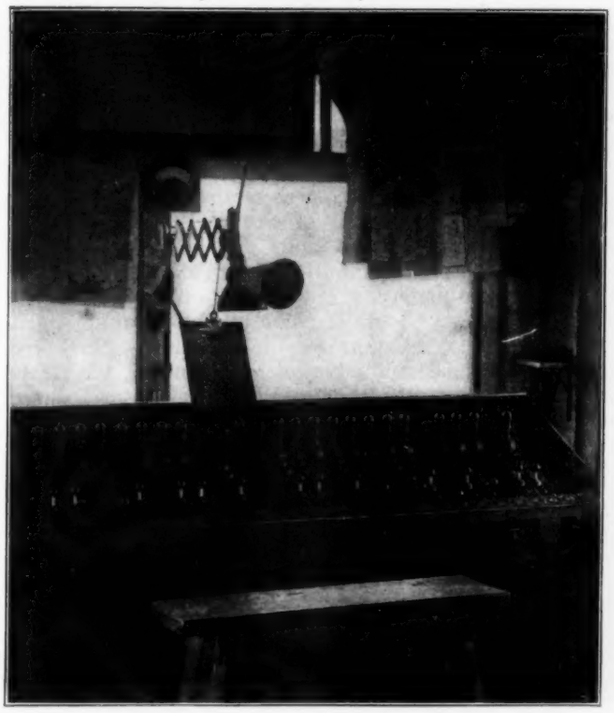
Similarly, the damage to equipment seemed best apportioned on a car basis, although this obviously is not entirely proper. With riders, this cost was about 2.4 cents per car, and with retarders 0.6 cents per car. The damage to the contents of the cars that could be traced seemed so small as to be negligible.

The investment for the machine switch facilities was estimated on the basis of operation from one tower and with smaller power facilities than were used with retarder operation, the total amount being $46,000. With joint machine switch and retarder operation, the total was about $315,000, including interest during construction. Allowing five per cent interest and omitting taxes, since they are assessed on income in this case, the capital charges were $2,300 with the machine switches and $15,750 with machine switches and retarders. An additional charge of five per cent for a renewal reserve to take care of the replacement of more comprehensive units than had been done in the course of ordinary maintnance so far, seemed desirable. This makes the over-all capital charges $4,600 and $31,500 respectively. Tabulating these costs we get the results shown in Table 6.

Table 6—Comparison of Fixed Costs Per Year and Variable Cost Per Car

	Rider & Hand Switches	Rider & Machine Switches	Retarders and Machine Switches
Fixed Costs Per Year			
Labor	$74,164	$73,037	$64,357
Capital	0	4,600	31,500
Engine operation	53,728	53,728	32,267
	$127,892	$131,365	$128,124
Variable Costs Per Car			
Riders	0.13	0.13	
Damage	0.024	0.024	0.006
Maintenance	....	0.005 (est.)	0.02
	$0.154	$0.16	$0.026

With the range of 250 to 450 cars humped per shift, the savings effected by retarder operation, based on these expenses, are shown in the curve chart for various numbers of cars handled. The difference between hand switching and power switching is negligible. Between rider and retarder operation the difference is constant, regardless of the number of cars handled, because the fixed costs are about the same for both types of operation, the engine saving being just about balanced by the increased capital charges. The net unit saving, including what ordinarily are classed in both operating and capital expenses, is about 13 cents a car humped and the total saving varies directly with the number of cars humped. With about 300,000 cars humped per year, as was the case at Hartford in 1927, this would amount to about $39,000, or 12 per cent return on the capital invested, after deduction of all charges.



The Track Diagram and Telephone Equipment are Located Conveniently to the Control Machine in the Tower

In addition to these savings, there are others of considerable importance which do not lend themselves readily to evaluation. The saving in per diem on account of faster passage through the yard is one such item. The saving in general expense of handling cars

in and out of yards as a result of quicker classification is another. Still another is the saving in personal injury claims, of which none occurred in this yard during rider operation. Further, there is the better utilization of the yard investment as a whole, where the number of cars handled is increased above that which could be handled by riders. The capital and fixed costs of the yard as a whole have to be pro-rated to the cars handled so that with an increase in number the amount chargeable to each decreases.

Associated Traffic Clubs' Semi-Annual Meeting

THE Associated Traffic Clubs of America held their semi-annual meeting at Chicago on October 24 and 25, with 150 representatives of 35 of the 50 member clubs in attendance. The docket included a report of the Educational committee, a discussion of educational work in the clubs, the consideration of a resolution to supplant the semi-annual meeting of the Association with regional meetings, and a discussion of the interchange club courtesies. An address of welcome, prepared by Samuel O. Dunn, editor of the *Railway Age*, was presented by C. D. Morris, assistant to the chairman of the Western Railways' Committee on Public Relations

The Educational committee reported that member clubs are pursuing their educational program with increased interest. Various clubs are undertaking open forum meetings this year for the first time. Some are organizing traffic study groups while others are starting evening extension traffic classes in cities where evening schools do not offer traffic courses. Other clubs are co-operating with city evening high schools, Y. M. C. A. schools, and university extension classes.

Since the meeting of the Association in June, when a resolution was passed, requesting the Secretary of Commerce to include traffic and shipping waste in his drive to eliminate waste in industry, a survey looking into existing organizations and methods employed by business concerns in handling their traffic affairs has been inaugurated. It is being directed by the Transportation division of the Bureau of Foreign and Domestic Commerce of the Department of Commerce in Washington and is assuming increasing proportions. The work will probably require two or three years.

A short time prior to the meeting, the Oklahoma City club presented a resolution asking that the semi-annual meetings of the club be supplanted by regional conventions. The Association, however, did not accept, feeling it would be unwise for it to sponsor regional meetings, especially among clubs that are not so situated as to enable them to participate readily in such gatherings. It was agreed that regional meetings should be developed among the individual clubs rather than through a plan laid down by the Association.

It was also suggested that the member clubs interchange courtesies but the idea was opposed by both the larger and the smaller clubs. The larger clubs that have expensive quarters felt that such a practice would jeopardize their non-resident membership since any member of a club of another city would have the same privileges as a non-resident member without the payment of dues. The smaller clubs without quarters also opposed the plan, feeling that they could not offer as much as they received and would continually be indebted to the larger clubs.

Samuel O. Dunn Discusses Railway Problems

Mr. Dunn emphasized the importance of traffic clubs to both shippers and railways. "Twenty years ago," he said, "the relations between the shippers and the railways were very unsatisfactory. They are today very satisfactory. The formation of traffic clubs has contributed largely toward this improvement. Most of these clubs were formed originally as social organizations. There was, however, a business motive involved. It was believed that if shippers and railway officers met socially more frequently and got better acquainted, the effect would be to reduce the amount of friction in their business relations. This undoubtedly has been one of the effects.

"I express, of course, only a personal opinion when I hazard the view that the social advantages of these clubs would not be reduced, and that their value would be increased if they would devote more study and effort to the solution of transportation problems. The shippers want good railway service and fair and reasonable rates. The railways want to render good service and to get fair and reasonable rates for it in order that they may earn fair net returns. There is no incompatibility between these things. On the contrary, the railways would not be entitled to fair and reasonable rates and adequate net returns if they did not render good service and, on the other hand, the shippers cannot long hope to get good service unless they pay fair and reasonable rates.

"Nor do I believe there is any incompatibility between the views of well-informed shippers and well-informed railway officers regarding the means that should be adopted to attain the desired ends. I have always believed that reasonable and well-informed shippers and railway officers could settle in conferences most of the differences that arise between them. Whether fortunately or unfortunately, it is a fact that we have developed a policy of government regulation which makes it difficult or impossible for shippers and railway officers to settle their differences in the ways in which most other business differences are settled. Our policy of regulation has given public men a large and even dominating influence in the settlement of many railway questions. Public men constantly try to exercise influence on decisions of the Interstate Commerce Commission. We are confronted at the present time with the serious danger of direct rate making by Congress. Passage of the proposed legislation to abolish the Pullman surcharge would be direct rate making by Congress and a reversal by Congress of a decision made by the Interstate Commerce Commission after full hearings and deliberation. It is unnecessary to tell you of the similar significance of the passage of the Hoch-Smith resolution and of the passage by the Senate at its last session of a resolution practically directing the commission to reduce the rates of the northwestern railways on farm products.

"These are matters that vitally concern both the shippers and the railways. Neither of them can afford to have rate making become an arbitrary exercise of the uninformed and political will of Congress."

THE NEW BUILDING of the Lackawanna Railroad Young Men's Christian Association, at Elmira, N. Y., was dedicated on October 15. This building is said to be one of the finest and most complete structures of the class in the country. It is of pure colonial design.

Electrical Men Hold Convention

E. MARSHALL
Great Northern
President

Increasing Uses for Electrical Energy Present Many Problems

—

Lively Discussions Mark Annual Meeting of A. R. E. E.

J.A.ANDREUCETTI
Chicago and Northwestern
Secretary and Treasurer

THE nineteenth annual convention of the association of Railway Electrical Engineers was held in Chicago at the Hotel Sherman, October 23 to 26 inclusive. E. Marshall, electrical engineer of the Great Northern presided.

The keynote of President Marshall's address was efficiency. He stated that there was no reason why the railroads should make use of electrical appliances except for the efficient results to be obtained. He traced the development in the use of electrical appliances from the early days of the telegraph, to the more modern uses of electrical energy in lighting, machine tool drives, and other applications, pointing out the gain in efficiency by the use of individual motors where these are practicable. The elimination of heavy line shafting for the operation of machine tools has made it possible to locate certain large tools more advantageously so that the routing of work through the shop can be more efficient.

Mr. Marshall emphasized the advantages offered by the convention for making contacts with other electrical men who are working on similar problems.

The report of the secretary-treasurer Joseph A. Andreucetti, electrical engineer, Chicago & North Western, showed the association to be in a most excellent financial condition, with no liabilities, and assets totaling over $6000.

A. E. Voigt, carlighting engineer of the Santa Fe, brought up the matter of expenses incurred by committee members in attending meetings. He suggested that the Association should pay such expenses. Considerable discussion followed in which it was pointed out that in practically all cases the expenses of members of committees were paid by their respective roads. It was finally voted that the secretary be instructed to call to the attention of each committee appointee the importance of his securing permission from his superior to serve on committees and give the necessary time to the work.

The following officers were elected to serve for the ensuing year: President, J. L. Minick, assistant engineer, Pennsylvania System; first vice-president, J. C. McElree, electrical engineer, Missouri Pacific; second vice-president, R. G. Gage, electrical engineer, Canadian National. J. J. Hack, carlighting engineer, Southern Pacific, and F. E. Starkweather, electrical engineer, Pere Marquette, were chosen as members of the executive committee.

Radio

The report of the committee on the application of radio to railway service was confined chiefly to an account of tests made on the New York Central and the Chesapeake & Ohio. Roy Liston, mechanical inspector of the Santa Fe, and chairman of the committee, read the report. On each of the roads upon which the tests were made, the locomotive and caboose were equipped with radio transmitters and receivers, reception being by loud speakers. The tests as a whole were satisfactory, and demonstrated clearly the practicability of radio communication on long freight trains. The committee recommended that it be continued, and that it follow up the development of radio communication for freight train service, and also the development of radio for entertainment in railway passenger service.

In the discussion which followed, George W. Bebout, electrical engineer, Chesapeake & Ohio, stated that he was firmly of the opinion that radio was going to find its place on the railroads, and that the railroads were five years behind the times in supplying adequate communication between locomotive and caboose on long freight trains. He deplored the fact that the manufacturers held the prices for the equipment so high that roads were reluctant about purchasing it. In showing the economy effected by the use of radio, Mr. Bebout pointed out the saving in coal that could be made by getting the trains over the road in less time when adequate communication was furnished. Although in all probability the present equipment will be improved he was certain that the apparatus as it is today could be used to advantage.

Although the matter of code communication versus voice communication was broached, it seemed to be the consensus of opinion that voice communication was what was required. While the present equipments are designed to operate on 24 volts, it is the intention of the manufacturers to develop subsequent installations for use with 32 volts, the standard voltage for train lighting.

Manual

The report of the committee on the Manual was brief, stating that the executive committee had authorized a complete revision to incorporate all changes and additions, including those approved at the 1928 convention.

Power

The report of the committee on power was outlined by President Marshall, chairman of the committee, and by J. E. Meagher, electrical inspector, Chicago & North Western. In substance the report was a continuation of the study of various factors entering into economical boiler plant design. Mr. Marshall discussed the subjects of combustion and furnace design, stokers, piping and prime movers, while Mr. Meagher explained certain details regarding purchased power and power contracts.

A number of charts were presented, in reference to combustion and furnace design, showing the relation between heat values, not available for the boiler, the CO_2, excess air and ratio grate surface to furnace volume, under different rates of firing and for different types of coal.

In discussing the costs of operating a power plant, Mr. Meagher analyzed the various items of a form which was included in the report. Such items as the cost of fuel, freight on fuel, water, ash and cinder removal, lubricants, supplies, etc., were listed, together with the labor charges of electricians, engineers, firemen, oilers, coal passers, etc. An electrical power record form was also presented which was designed to be kept by the electrical engineer's department. On this latter form were spaces for all of the items which must be considered in the matter of determining the cost of purchased power.

The committee recommended as to its future work that it consider the cost of power production with the use of oil engines versus purchased power, report on the adaptability and economical value of drafting engines by motor driven exhaust fans, and study further all factors tending to effect economies in power costs, including costs of steam, oil engine and electric power.

The discussion which followed the presentation of the report was long and animated. A large part of it pertained to power contracts between the railroads and the power companies. Mr. Andreucetti described his practice in handling power contracts, stating that he was making a study of each contract which his road had with power companies. He has appointed an inspector whose sole duty it is to investigate the normal and abnormal use of power at the various points along the line. By keeping constantly after the matter they have been able to better conditions considerably, and to make contracts with the power companies which are more favorable to the railroad. It is a long program, however, and will probably require at least two years before all of the existing contracts can be investigated.

G. T. Johnson, assistant electrical engineer, New York, New Haven & Hartford, called attention to the fact that there are relatively few railroad power plants that are equipped with suitable meters to ascertain just what the plants were actually doing; in his opinion it is practically impossible without such equipment to know whether any plant is working efficiently or not.

It was pointed out that there are many small power plants that can probably be dispensed with and considerable savings effected by the use of electrically operated fans for drafting engines. In some cases it was shown that remarkable savings could be effected by this practice.

The rates charged by power companies were discussed at great length, but because of the many variable factors in the power contracts between the railroads and the power companies throughout the country, the discussion did not lead to any definite conclusion. Several members of the association explained the desirability of having a standardized form of contract.

Motors and Control

The work of the committee on motors and control was divided among three sub-committees which handled the following subjects: Application of motors to various types of shop machines, including recommended size of motor and type of control; instruction for maintenance and tests of electric motors; and the specification for the purchase of motors, and a form to be used by the various departments in ordering them. The committee recommended that the tables of motor application to machine tools which were presented in the report, be expanded and submitted for the manual next year. The report was presented by the chairman, C. G. Winslow, assistant electrical engineer, Michigan Central, and T. W. Wigton, assistant electrical engineer, Chicago, Burlington & Quincy.

During the discussion which followed J. L. Minick made a statement with regard to the standardization of motors made by different manufacturers. He said that the work in this connection was progressing as well as could be expected, and that while it would probably require several years, because of the great amount of data that must be collected, everyone was doing his utmost to bring about standardization.

Mr. Bebout called attention to the fact that there was a tendency on many roads to use larger motors than was actually necessary to do the work. This is particularly true in the case of machine tools, in some cases 50 hp. motors being used where 30 hp. would be sufficient. Such a practice is greatly reducing the power factor, and is necessitating a large expense in the cost of distribution lines. Other instances of this nature were cited by other members. Mr. Winslow said that smaller motors could often be used if properly protected, and that such practice would effect a considerable reduction in the cost. C. P. Kahler, electrical engineer, Oregon Short Line, said, however, that if motors are made too small it might be the means of crippling some important machine tool, and that it might not be wise eo extend such practice to machines which were used frequently.

Train Lighting

A synopsis of the report of the train lighting committee was given by the chairman, P. J. Callahan, supervisor of train and locomotive lighting, Boston & Maine. The report which was long was devoted largely to a revision of the specifications for axle generator equipment. In rewriting these specifications an effort was made to retain all of the fundamental requirements of the old specifications, with such changes as were necessary to keep abreast of progress in practice and development. Among the subjects touched upon by the committee were standardization of axle pulley bushings, lighting of parked Pullman cars, electric re-

frigeration in dining, club and business cars, use of fabric-faced pulleys, development of locomotive train lighting, development of a permanent train line connectors, application of electric marker lights to electrically lighted trains, standardization of rail motor car lighting practice, and standardization of car lighting battery capacity ratings.

The committee cited instances in the lighting of parked Pullman cars, in which the batteries required charging, making it almost imperative that direct current be available. It was thought that perhaps the use of gas or steam driven generators, mounted in cars would be advantageous. Such cars could be fitted with the necessary equipment and transferred from point to point as desired, a rental charge being paid by each railroad using the equipment. It was felt that the operation of electrically refrigerated dining cars had not been sufficiently extensive to make a cost comparison between this type of refrigeration and ice refrigeration.

Reports concerning the use of fabric-faced pulleys were confined to their application on a single railroad, but the results obtained were such that the committee recommended that as many tests of fabric-faced pulleys be made as possible. One instance was cited of a pulley which had been surfaced with fabric after further recrowning was impossible, and more than 150,000 additional miles of service obtained.

The question of standardizing lighting practice for rail motor cars was referred to a sub-committee, to work in conjunction with a sub-committee of the committee on self-propelled vehicles. The sub-committee had been unable to hold a joint meeting, however, and it was recommended that the subject be continued.

The committee recommended as to battery ratings that capacities of all car lighting batteries be obtained at the eight-hour discharge rate, and full capacity to be obtained after not more than three cycles. Specific gravities of Planté type lead battery, and the pasted plate lead battery, should not exceed 1225 and 1260, respectively. For alkaline batteries a specific gravity not exceeding 1220 was recommended. The average voltage per cell at the end of discharge was recommended as 1.75 for lead batteries and 1.12 for alkaline batteries. It was also recommended that the name plate of each battery should bear the following information: Type of battery, capacity, specific gravity, normal charging rate, and manufacturer's name.

A large part of the discussion dealt with the matter of parked Pullman cars. It developed that several roads had quite a number of baggage cars, equipped with turbo generators, which they had been using for this purpose. This type of equipment, however, belonging to an older period in train lighting, for the most part appeared to be obsolescent, and all but one of the roads that had the equipment did not appear to be favorably disposed towards using it. Mr. Andreucetti called attention to the fact that the use of Pullman cars for conventions was a business of such an uncertain nature and so indefinite that practically each time that the problem of furnishing light to these cars arose, it had to be met in a different way.

It was contended by some that electrical refrigeration for diners was far from economical, owing to the excessive drain on the batteries in keeping the refrigerating motors operating. On the other hand, C. R. Gilman, car lighting engineer of the Chicago, Milwaukee, St. Paul & Pacific, on which road some of the cars are operating, was an enthusiastic supporter of this form of refrigeration. There was, however, insufficient information available to draw any definite conclusions.

Again, with the matter of fabric-faced pulleys, the number of installations is so small, that it can not be said with finality whether or not this type of pulley will give increased belt life. Frank Zimkowski, car lighting supervisor, New York, New Haven & Hartford, gave some figures which showed a wide divergence of results. In one case a belt had been in service for a year and nine months, in other instances there did not seem to be any advantage over the metal pulleys.

L. S. Billau, assistant electrical engineer, Baltimore & Ohio, called attention to the fact that the lighting of rail motor cars could not well be treated as a single problem, but rather as a variety of problems. For instance, there is the case of the individual motor car, with or without trailer, not equipped with batteries, and again the trailer which is used as a mail car. With the advent of more powerful motor cars, there may be two or three light weight trailers. It is always possible, he said, to fall back on standard axle lighting equipment, but the question of reducing weight enters in.

After considerable discussion the recommendations of the committee regarding the battery rating were adopted.

Locomotive Electrical Equipment

The work of the committee on locomotive electrical equipment was prepared by two sub-committees which handled the subjects of cost accounting of train control and train stop systems, and insulated wire for steam locomotives, respectively. The sub-committee on train control made a number of specific recommendations as to how the different charges should be allocated, and the second sub-committee drew up tentative specifications for single conductor, insulated copper wire for use on the locomotive. The wire specification formed the major portion of the report.

For its future work the committee recommended that it prepare a comparative report on the performance of automatic train control and train stop systems, and continue the work on wire specifications, by making service tests and complete laboratory tests of wire made in accordance with the wire specifications, with the view of placing the specifications in the manual when their value is proved.

Practically all of the discussion which followed was devoted to the wire specifications. Representatives of the wire manufacturers were unfavorably disposed towards the specific recommendations of the committee regarding the ingredients used in the manufacture of wire. It was stated that wire could be made in accordance with the specifications as drawn, but it was contended that it would be better to permit the manufacturers sufficient latitude to develop a wire that would meet the requirements of the railroads for locomotive purposes. The committee stated that such wire had not been available in the past, and it was the thought of the committee that specific recommendations would hasten its development.

Illumination

Mr. Billau, chairman of the committee on illumination, outlined the developments of incandescent lamps for train lighting and locomotive lighting use, as well as those for special purposes. A number of tables included in the report gave a comparison of the demand for lamps of various types and sizes. It was observed that while there had been an increase in 32-volt lamps in the 30-34 volt range, and for the 64- volt lamp in the 60-65 volt range, there was still a relatively large demand for the 33-volt lamps. Inasmuch as the Associa-

tion of Railway Electrical Engineers and the Mechanical Division of the American Railway Association has officially adopted as recommended practice, 32, 34 and 64 volts as standard voltages for train lighting lamps, the committee felt that roads now using non-standard voltages should change over to standard voltage rating. With the exception of the addition of the 75-watt lamp to the lamp schedule, there have been no new developments in lamps for train lighting service. This lamp is now available in the A-23, inside-frosted bulb instead of the PS-22 clear bulb.

The committee also stated that during the past year a new system of lighting for 600-volt circuits had been developed which employed 30-volt Mazda C lamps operating approximately 20 in series. The lamp has an automatic cut-out device which short circuits the lead wires when the lamp fails, thereby maintaining the circuit through the remaining lamps. This lamp is now available in two sizes designated as 30-volt, 1-ampere, A-19 bulb and 30-volt, 1.6 ampere, A-21 bulb.

In addition to the information presented on the subject of train lighting lamps, the committee has continued its work on floodlighting and considerable attention was given to the matter of selecting floodlighting projectors. One section of the report included a list of definitions pertaining to the terms used in floodlighting, in order that a common ground of understanding might be provided for a discussion of the subject. The committee recommended that all branches of its activities be continued.

The first item to be discussed was the question of standardizing bolt-hole spacing for the bases of floodlighting projectors. One manufacturer submitted a plan for using five holes instead of three, as suggested by committee, but this plan was not given much encouragement by the committee since it felt that only one standard for bolt-hole spacing was desirable.

The use of 100-watt, inside-frosted lamps for switch engines received some comment. J. J. Hack, carlighting engineer, Southern Pacific, said that he had tried some of these lamps for six months on various divisions and that they were highly approved by master mechanics, traveling engineers, locomotive enginemen and switchmen.

Floodlight projectors using 2500-watt lamps were suggested as a future possibility, but no experience had been had with units as large as this. It was felt, however, that larger units might be substituted for a number of smaller ones and economies effected.

Electric Welding and Heating

The report of the committee on welding and heating was brief. It was confined to a list of subjects, practically all of which were concerned with the design and operation of welding machines. The committee proposed to continue its study of the subject of electroplating with a view of presenting data to be added to the manual during the next year.

The discussion which followed was long and highly technical, much of it on the part of the manufacturers, especially in connection with capacity ratings of welding machines. Nearly all of the discussion pertained to the details of design of such machines. There seemed to be a demand for a welding generator especially adapted to track work.

Self-Propelled Vehicles

The committee on self-propelled vehicles reported that it had made a study of the development, growth and use of automotive equipment during the past several years, and stated that it believed there would be a rapid increase in the purchase and use of such equipment by the railroads. In view of the changing nature of the work of the committee, it recommended that the committees name should be changed from the present one to "Committee on Railway Automotive Equipment." It further recommended that the personnel of the committee be enlarged and the work continued.

Lighting Automotive Equipment

With regard to lighting automotive equipment, the recommendation was made that the 32-volt system be adopted as standard, and that some form of light weight axle equipment be developed that could be used with trailers when these cars were connected with motor cars of 300 hp., or more.

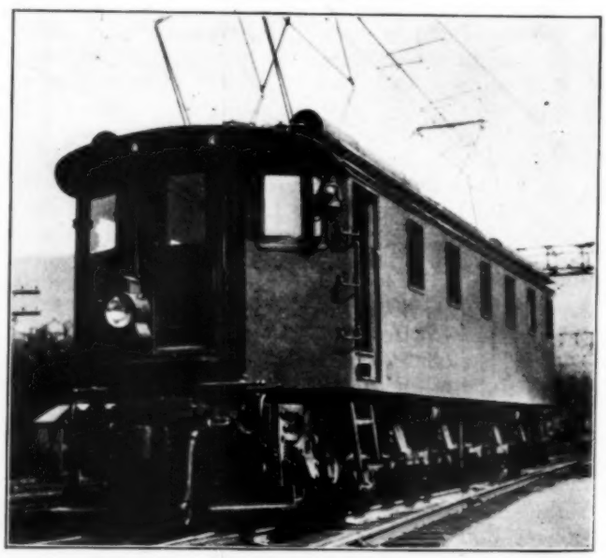
The discussion was long, highly technical and again the manufacturers furnished the major portion. The keynote of the entire discussion was the desirability for harmonious design in rail motor cars, with respect to the selection of engine, generator, motors and auxiliary apparatus. It was pointed out that it was of greatest importance that these several units be adapted to work together harmoniously in order to secure the most efficient operating results.

The question of adopting 32-volts as a standard for rail motor car lighting received only brief comment and while this standard was not specifically adopted, the intimation was that it would be subsequently.

R. E. S. M. A. Elects Officers

At the annual meeting of the Railway Electrical Supply Manufacturers Association, held on Thursday, October 26, the following officers were elected: President, William A. Ross, Pyle National Company; senior vice-president, John McC. Price, Industrial Controller Company; junior vice-president, Carlos Dorticos, General Electric Company. On the executive committee, to serve for three years, R. I. Baird, Electric Storage Battery Company; William L. Nies, Fairbanks-Morse Company and W. R. Pflasterer, United States Graphite Company were chosen. C. B. Harlow, Benjamin Electric & Manufacturing Company was chosen to serve for two years on the same committee.

* * *



B. & M. Electric Locomotive at North Adams, Mass.

Missouri Pacific Lines Improve

Modern methods and betterments bring increased yield from heavier traffic

THE comprehensive program of physical improvements and operating economies of the Missouri Pacific Lines has combined with the development of traffic in its territory to bring more satisfactory financial returns. The Missouri Pacific proper had a surplus of $6,258,806 after charges for the first nine months of the current year, as against $2,297,104 last year (abnormally low because of the floods) and $5,862,082 in the first nine months of 1926.

Operating statistics of the present year cannot fairly be compared with those of 1927 because of the extraordinary expenses brought about by the 1927 flood. Instead comparison must be made with similar periods in 1926. Table I gives selected freight operating statistics for the first seven months of the current year as compared with the first seven months of 1926. The improvement to be noted is marked in almost every respect wherein capital improvements designed to effect operating economies would likely be reflected. Freight train-miles, locomotive-miles and train-hours were reduced in the face of increased traffic. Train speed, tons per train (both gross and net) and ton-miles (gross and net) per train-hour showed measurable advances.

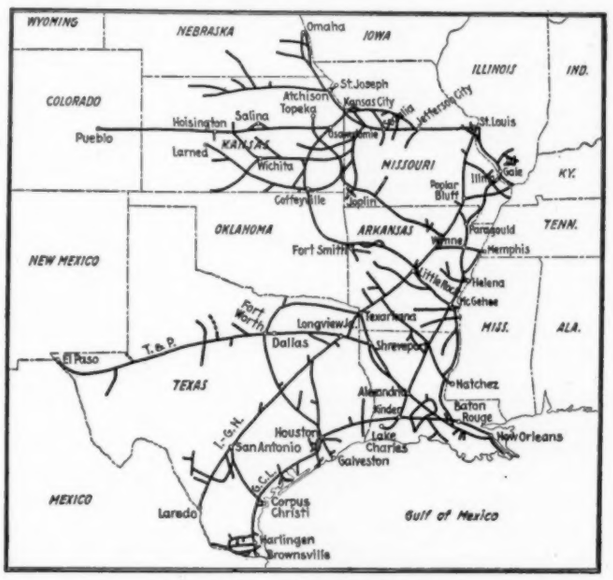
T. & P. Has 100 Per Cent Traffic Increase

Table 2 gives similar comparisons for the Texas & Pacific and records one of the most striking developments of recent railroad history. The Texas & Pacific not only has the advantage of increased operating efficiency, but also shows an increase in traffic of no less than 103.8 per cent, as measured in net ton-miles. This increase is due largely to the development of oil production in its territory. This heavy additional business, however, it has handled with less-than-proportionate increases in train-miles, locomotive-miles, car-miles and train-hours. Car movement has been speeded up 45.6 per cent to 48.5 per cent car-miles per car-day and the average car-load has increased 18.7 per cent. Fuel consumption per 1,000 gross ton-miles has declined, and average daily locomotive mileage has increased 53.8 per cent. The T. & P.'s operating ratio for the first eight months of 1928 was 68.5, as against 77.7 for the same period in 1926, and its net railway operating income was $6,301,088, or 102 per cent more than for the first eight months of 1926.

Application of Better Operating Methods

The Missouri Pacific in recent years has worked consistently toward improving its operating efficiency, both by investing funds in promising additions and betterments and by applying improved operating methods. The more important of these improvements have been described in recent articles in the *Railway Age*. The Missouri Pacific has a comprehensive plan of "main tracking" freight trains, including not only its own lines but connections as well, which keeps the handling of these trains at intermediate points down to a minimum, and incidentally gives better service to patrons. Main tracking has saved the road important additions to yard and terminal facilities which, with the old method of handling, increased business would have necessitated. The company has also centralized the control of its yard operations so that all terminals work together to expedite movement over the system. Improved methods of car handling also have brought important savings in per diem charges.

Long engine runs are now the rule on the entire system—the average now being 284 miles for the Missouri Pacific proper as against 126.5 miles before the program was instituted. This change has resulted in the discontinuance of several locomotive terminals and the reduction of expense at others.



The Missouri Pacific Lines

Signals and Second Track

The road has each year increased its installation of automatic signals as an aid to train movement and has just announced a program for 1929 which will give it 1507 miles, or 41 per cent, of its main line automatically signalled—most of the newer installations being of the color-light type. The company also has been adding to its mileage of second track from year to year—mostly short stretches at congested points. Work of this character on its Kansas City-St. Louis line, however, has been of major proportions and upon its completion the road will have double track from the Mississippi river south of St. Louis westward to Jefferson City, from which point westward it has alternate main lines. The last part of this double track program, on the eastern end, has now been announced and the result should be further important economies in the handling of the heavy St. Louis-Kansas City freight traffic, especially as the entire line will have easy grades.

The Texas & Pacific has likewise extended its mileage of automatic block signals and has recently placed

in operation its new Lancaster terminal near Fort Worth. This terminal is equipped with car retarders icing facilities and a modern engine handling plant and car repair facilities. The T. & P. and the Missouri Pacific have made extensive terminal improvements at Gouldsboro, La., and Alexandria.

New Power Helps T. & P.

Of the outstandingly effective capital expenditures made by the Texas & Pacific, high in rank must be placed its modern heavy power. In November, 1925, the road received ten of its "Texas" type (2-10-4) locomotives. In 1927 an additional 35 of this type were ordered and during the current year 15 more are being delivered. There can be no doubt that the efficient handling which the road has given its greatly increased traffic has been due in substantial measure to these modern locomotives—powerful, economical and fast.

Table 1—Missouri Pacific—Comparison of Selected Freight Operating Statistics

	First seven months 1928	First seven months 1926	Per cent of change Inc.	Dec.
Mileage operated	7,405	7,287	1.6	
Gross ton-miles (thousands)	16,105,089	15,458,485	4.2	
Net ton-miles (thousands)	6,720,207	6,606,498	1.7	
Freight train-miles (thousands)	9,310	9,355		0.5
Freight locomotive-miles (thousands)	9,036	9,897		8.7
Freight car-miles (thousands)	422,795	409,227	3.3	
Freight train-hours	669,271	738,321		9.4
Car-miles per day	40.0	38.9	2.8	
Net tons per loaded car	24.7	24.9		0.8
Per cent loaded to total car-miles	64.4	64.9		0.8
Net ton-miles per car day	637	628	1.4	
Freight cars per train	46.4	44.7	3.8	
Gross tons per train	1,730	1,652	4.7	
Net tons per train	722	706	2.3	
Train speed, miles per train-hour	13.9	12.7	9.5	
Gross ton-miles per train-hour	24,064	20,937	14.9	
Net ton-miles per train-hour	10,041	8,948	12.2	
Lb. coal per 1,000 gross ton-miles	125	131		4.6
Loco. miles per loco. day	73.2	75.4		2.9
Per cent freight locos. unserviceable	13.3	14.0		5.0
Per cent freight cars unserviceable	5.6	6.7		16.4

The affiliation of the Gulf Coast Lines, the International-Great Northern and the Texas & Pacific with the Missouri Pacific has been mutually advantageous to all the component companies. Their interchange of traffic has increased. Likewise the connection at Pueblo with the Denver & Rio Grande has been increasingly productive from a traffic standpoint.

Agricultural Development Promising

The Missouri Pacific Lines place great store in agricultural development in their territory. In the Rio Grande Valley section on the Gulf Coast Lines and the "Winter Garden" section on the International-Great Northern there has been a tremendous increase in the production of perishables under irrigation. This the railroads have fostered in every way—particularly by speeding up the handling to terminals at St. Louis and Kansas City.

Agricultural development work, however, has not been confined to Texas; progress is being made throughout the territory served by the system. In Arkansas and Louisiana the work is particularly important, since something must be substituted to take the place of cut-over forests if the territory is to continue to produce traffic. The cultivation of strawberries and peaches is being successfully fostered in Arkansas, each year increasing the traffic in these products. There has been a big increase in the production of apples and grapes in the White River district of Missouri and a similar increase in cantaloupes and mixed vegetables in Western and Eastern Colorado. Poultry and dairy production has been stimulated generally in the territory.

The Gulf Coast Lines and the I.-G. N.

The Gulf Coast Lines have not been as fortunate from a traffic standpoint during the current year as have the other Missouri Pacific Lines—the seven months total net ton-miles this year being 11.6 per cent lower than the same period in 1926. In spite of this, however, the road was able to show an improvement of 8.9 per cent in gross ton-miles per train-hour, bringing this figure to 22,026, and a reduction of 4 per cent in fuel consumption per 1000 gross ton-miles. The average under this heading, pounds of coal per 1000 gross ton-miles (in this case being oil fuel equated to coal), reached the low figure of 96. The operating ratio for the first eight months of the current year was 71.2.

The International-Great Northern's net ton-miles in the first seven month's of the current year totaled 17.4 per cent more than in the same period of 1926, which increase was handled with a slight reduction in freight train-hours and only a slight increase, 3.8 per cent, in freight train-miles. Freight cars per train increased 11.2 per cent to a total of 43.6; train speed increased 4.4 per cent to 14.3 m.p.h.; and gross ton-miles per train-hour went up 20.6 per cent to 21,878. Fuel consumption per 1,000 gross ton-miles fell to 112 lb. (coal equated from oil). The I-G. N.'s operating ratio for the first eight months was 82.18.

Table 2—Texas Pacific—Comparison of Selected Freight Operating Statistics

	First seven months 1928	First seven months 1926	Per cent of change Inc.	Dec.
Mileage operated	2,015	1,953	3.2	
Gross ton-miles (thousands)	6,436,401	3,264,677	97.2	
Net ton-miles (thousands)	2,462,264	1,207,939	103.8	
Freight train-miles (thousands)	3,826	2,104	81.8	
Freight locomotive-miles (thousands)	3,865	2,110	83.2	
Freight car-miles (thousands)	169,406	89,446	89.4	
Freight train-hours	306,042	161,653	89.3	
Car-miles per day	48.5	33.3	45.6	
Net tons per loaded car	25.3	21.3	18.7	
Per cent loaded to total car-miles	57.4	63.4		9.5
Net ton-miles per car day	705	450	56.7	
Freight cars per train	45.3	43.5	4.1	
Gross tons per train	1,682	1,552	8.4	
Net tons per train	643	574	12.0	
Train speed, miles per train-hour	12.5	13.0		3.8
Gross ton-miles per train-hour	21,031	20,196	4.1	
Net ton-miles per train-hour	8,046	7,472	7.7	
Lb. coal per 1,000 gross ton-miles	106	110		3.6
Loco. miles per loco. day	84.6	55.0	53.8	
Per cent freight locos. unserviceable	10.2	13.5		24.4
Per cent freight cars unserviceable	4.6	4.0	15.0	

Passenger revenues of the four companies show decreases for the first eight months of this year as compared with the same period in 1926. The Missouri Pacific's loss was 14 per cent, that of the International-

Table 3—Missouri Pacific—Revenues and Expenses

	Oper. Rev. Freight	Oper. Rev. Passenger	Total Oper. Revenues	Operating Expenses	Net Ry. Oper. Income	Gross Income	Net Income	Investment in Road & Equipment Increase
1921	$81,688,215	$19,241,029	$109,785,949	$91,693,855	$10,236,848	$15,270,486	$3,537,016	$8,885,159
1922	73,918,551	16,898,650	99,921,331	84,658,914	8,247,034	10,710,817	1,413,712*	6,712,521
1923	85,961,414	18,970,393	114,607,947	97,939,965	8,893,245	16,332,478	121,345	12,782,103
1924	95,949,391	17,525,199	123,647,723	98,466,365	15,817,584	19,384,445	6,503,217	18,731,055
1925	104,319,276	16,536,035	130,831,661	102,276,499	18,013,063	22,472,152	7,648,208	24,253,193
1926	107,913,649	16,035,972	133,990,294	102,851,943	20,333,785	23,955,071	8,631,667	19,337,885
1927	100,788,411	14,652,502	125,728,405	99,565,997	16,899,498	20,723,265	4,401,196	22,665,911

* Deficit.

Great Northern, 9 per cent and that of the Gulf Coast Lines 25 per cent, while that of the Texas & Pacific was only a little more than one per cent.

Maintenance Expenses

Maintenance of way expenses have been consistent—those of the Missouri Pacific being a fraction of one per cent greater in the 8-month period this year than in the same period in 1926, while those of the Gulf Coast Lines and the International-Great Northern declined 5 per cent and 9 per cent respectively. The increase in these expenses on the Texas & Pacific was 39 per cent, reflecting the effort to put the track in the very best condition for the 104 per cent traffic increase.

Maintenance of equipment expenses on the Missouri Pacific declined 9.1 per cent from the first eight months of 1926 to the same period this year and this decline was accompanied by a reduction in the number of unserviceable cars and locomotives; these expenses of the Gulf Coast Lines declined 2.8 per cent; and on the International-Great Northern they increased 1.6 per cent. The increase on the Texas & Pacific amounted to 21.9 per cent, which modest increase in the face of the much greater increase in business must be in large part ascribed to its important percentage of modern power. This favorable showing is all the more noticeable in that the percentage of unserviceable locomotives declined 24.4 per cent to an average of 10.2, when the first seven months of 1928 are compared with the same period in 1926.

Cumulative Preferred Stock

Financial interest in the Missouri Pacific at the present time is largely centered on the 5 per cent, cumulative convertable preferred stock on which dividends of $51.25 have accumulated, none having been paid. Allowing for regular dividends only on this stock, the company earned $4.30 per share on its common stock during the first nine months of the present year. This latter figure gives some indication of the present position of the Missouri Pacific as an earner, although of course no dividends can be paid on common stock until these accumulated preferred dividends are taken care of.

Modern Counterbalance Conditions

A plea for a closer adherence to the rules established to protect track as well as the locomotive itself

By H. A. F. Campbell

THE underlying or fundamental principles of counterbalancing which have proved satisfactory on the smaller and lighter locomotives of the past, remain the same for the present day larger and heavier locomotive. The underlying laws do not change.

But some modern locomotives are balanced so poorly and disobey the fundamental rules so much that one of two things must be true. Either we have been all wrong in the past, or some of our modern locomotives sooner or later will increase the upkeep of roadbed, rails and bridges so much that their speed will be limited very strictly, or they will be ruled off the track altogether.

Some engineers believe that the underlying rules of mechanics and physics cannot be disobeyed without paying a price and that, sooner or later, those that are so today glaringly disobeying the rules will decide that the price they are paying is too high. It may be fortunate if the price is not finally paid in tragedy.

The last set of counterbalance rules was drawn up in 1915 by a committee of the American Railway Master Mechanics' Association, of which S. G. Thomson, then of the Philadelphia & Reading, was chairman. They may be summarized as follows:

Keep the weight of the reciprocating parts on one side down to 1/160 of the total weight of the locomotive.

Then balance evenly among the driving wheels one-half of this weight of these reciprocating parts.

It is better if the reciprocating parts can be made light enough so as to weigh only 1/200 of the total weight of the locomotive.

It is not considered necessary to cross-balance the weight of either the revolving mass or the reciprocating mass that is placed in the wheels.

In considering wherein these rules must be followed or changed we will divide the counterbalancing question into three phases:

(a) The balancing of the direct fore and aft action of the reciprocating parts, tending to jerk the engine forward and backward.

(b) The balancing of the nosing action, or swinging moment, caused by the action of the reciprocating parts swaying the engine across the track.

(c) The balancing of the purely revolving parts in the wheel.

Reciprocating Weights

A very determined effort must be made to keep the total weight of the reciprocating parts on one side of the locomotive down to 1/200 of the total weight of the locomotive. This will need, first, the correct choice of the type of piston head, piston rod, crosshead and main rod; second, the choice of the proper materials, and, third, the most skillful design of each part. As the locomotive has more of its weight on the trucks, it will be easier to keep the reciprocating parts down to the desirable weight ratio. For example, it will be easier to do this on a 4-6-4 type than on a 4-6-2 type; easier on a 2-8-4 type than on a 2-8-2 type.

It must be remembered that two improvements in the balancing effects can be obtained by choosing a somewhat higher working pressure, which means a smaller diameter of piston. The reciprocating weight will be reduced and the nosing couple or swaying moment can be reduced, because the cylinder centers can be brought in.

Per Cent of Reciprocating Parts to Be Counterbalanced for Various Locomotive Types

Type of Locomotive	Per cent	Type of Locomotive	Per cent
4-4-0	50	2-8-0	50
4-6-0	50	2-8-2	40
4-4-2	40	2-8-4	30
4-6-2	40	2-10-0	50
4-6-4	30	2-10-2	40
4-8-2	30	2-10-4	30
4-8-4	30	4-12-2	30

When the reciprocating parts have been kept down to 1/200 of the weight of the locomotive and kept in as close as possible to the center of the engine, then balance them to the extent shown in the table.

The percentages in the table take account of the variations in the amount of weight carried on the trucks.

Wherever it can be done, divide the reciprocating weight that is to be balanced evenly in all the driving wheels, and place this reciprocating weight directly opposite the crank pin.

Revolving Weights

It is in the balancing of revolving weights that some of the modern locomotives are getting away from the elementary principles of good balancing. It seems incredible to believe, but some of our present freight locomotives are out of balance on the main wheel from 1,200 lb to 1,800 lb. Imagine what the effect must be on the machinery and the rail of having an unbalanced weight of 1,800 lb. revolving around at crank pin distance from the center of the axle at a rate of from 100 to 250 revolutions per minute. It would seem that we are losing our sense of proportion when we try to operate such a piece of machinery, even granting that the rails and roadbed have been made heavier. It must also be borne in mind that, in addition to being out of rotative balance by this great amount, the wheel is still further out of balance by reason of the difference of plane in which these masses are revolving.

What can be done? Insofar as the two-cylinder locomotive of high power capacity is concerned, very little can be done with the main wheel. A good answer would be to use a three-cylinder compound or a four-cylinder simple, duplex locomotive. But, if we are considering a two-cylinder locomotive, the revolving weights of the main wheel should go to the very limit to get out every extra pound of weight. It is surprising just how many pounds can be taken out, if a very determined effort is made to do so. With the larger diameter of drivers which make it possible, always cross-balance for the difference of the plane of these revolving weights. This much can and always should be done.

One interesting point should be noted with respect to three-cylinder locomotives. It is not necessary to balance any of the reciprocating parts. This leaves only the revolving weights to consider. With a fair-size driving wheel, these revolving weights can be balanced exactly. In other words, with a three-cylinder locomotive at all speeds, we only have the static load on the rail. This is well worth remembering when we consider that it is necessary to run the main wheel of the equivalent two-cylinder locomotive 300 lb. to 800 lb. out of balance, even when every possible care and skill has been taken.

HENRY NAUMANN, a railroad crossing watchman, of Hammond, Ind., has been awarded two medals by the Carnegie Hero Fund Commission; the first time in the 21 years' history of the Commission that the same person has been recognized twice. Naumann received in June, 1924, a bronze medal for saving a woman from the path of a train; and a silver medal has just been awarded to him for his heroism on March 30, 1927, the day before his resignation was to go into effect, for plunging in front of a train in an effort to save an aged woman. The woman was killed and Naumann's leg was crushed. In addition to the medal, he receives eighty dollars a month disablement benefit.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended October 20 amounted to 1,162,095 cars, a decrease of 28,032 cars from the preceding week. Loading of all commodities, with the exception of livestock and less-than-carload freight, showed a decline. The total was 33,040 cars larger than in the corresponding week of last year and 38,846 cars under loading in the corresponding week of 1926. Heavier loading of coal, ore and miscellaneous freight accounts for the increase in the total over a year ago while the loading of all commodities, except miscellaneous freight, was lighter than in the corresponding week of 1926. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, October 20, 1928

Districts	1928	1927	1926
Eastern	260,056	242,982	266,416
Allegheny	233,660	209,436	241,510
Pocahontas	62,981	57,606	62,516
Southern	160,091	163,783	169,323
Northwestern	171,470	175,938	183,471
Central Western	177,430	185.755	184,090
Southwestern	96,407	93,555	93,615
Total Western Districts	445,307	455,248	461,176
Total All Roads	1,162,095	1,129,055	1,200,941
Commodities			
Grain and Grain Products	51,826	60,514	54,315
Live Stock	39,645	40,682	40,099
Coal	203.033	192,808	226,804
Coke	10,412	9,388	13,087
Forest Products	65,381	67,873	72,954
Ore	59,500	45,285	65,295
Merchandise L. C. L.	269,584	269,411	272,571
Miscellaneous	462,714	443,094	455,816
October 20	1,162,095	1,129,055	1,200,941
October 13	1,190,127	1,120,007	1,202,780
October 6	1,186,598	1,102,994	1,174,928
September 29	1,196,768	1,126.903	1,180,049
September 22	1,143,214	1,126,402	1,175,407
Cumulative total, 42 weeks	41,755,949	42,524,810	43,151,278

The freight car surplus averaged 85,825 cars during the period ended October 15, as compared with 92,203 cars on October 8. The total included 45,181 box cars, 14,866 coal cars, 12,566 stock cars and 5,163 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended October 20 totalled 92,608 cars, an increase over the previous week of 487 cars and an increase over the same week last year of 5,107 cars.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
October 20, 1928	92,608	41,749
October 13, 1928	92,121	42,800
October 6, 1928	89,651	42,347
October 22, 1927	87,501	38,802
Cumulative Totals for Canada		
October 20, 1928	2,904,182	1,655,277
October 22, 1927	2,660,793	1,580,474
October 23, 1926	2,557,933	1,570,478

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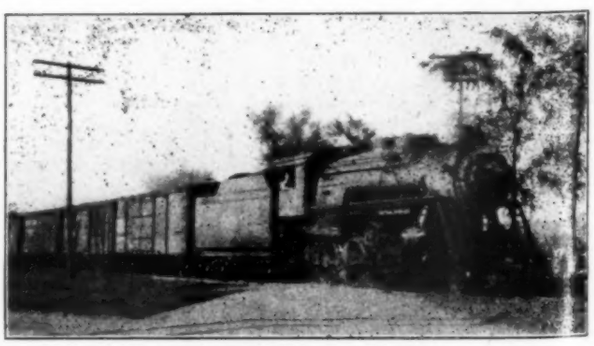


On the Central Vermont

A Railway Concert for Maintenance of Remunerative Rates

Vitally essential that nation-wide studies be made and that joint action be taken promptly

By Alba B. Johnson
President, Railway Business Association

THE *Railway Age* of October 20, discussing the downward trend of railway rates, and the need of greater co-operation among the railways in the maintenance of remunerative rates, asks this question:

"May it not become necessary for them to form committees composed of men who are not connected with individual lines, but who represent entire groups of railways or the railways as a whole?"

Some of my railroad friends are answering that this is already necessary; and I agree with them. One of the most serious dangers just over the horizon is that the roads may drift into a substantially busier era and find their income unequal to the more rapid enlargement of plant then requisite. Advocates of another and final federal seizure of the properties are almost mute during the current period of excellent service and of contentment among shippers. Without allies from that quarter they seem to realize that they cannot attract attention, and are not trying. They wait for a time of facility shortage.

The mighty and triumphant exertion put forth by the roads following the relinquishment of the properties by President Wilson had for its motive not alone the sense of obligation to serve agriculture, industry and commerce as effectively as possible but also the determination to silence the government ownership monster by an exhibition of new standards in transportation under non-government operation for contrast with the recent national experience under federal control. Both these motives should and do animate the railway managers in their outlook for the future. They are resolved to go on indefinitely carrying the traffic promptly and satisfactorily. To do this, they must pour billions more into plant. To spend billions they must obtain billions. To attract such input of capital they must present to investors the sort of earnings and income statements that investors and their advisers are in the habit of considering the earmark of a superior place in which to risk money.

Downward Trend of Rates

It is unnecessary to construct here a consolidated budget for the next ten years, announce how much capital is regarded as essential, and, analyzing the financial reports of the railroads, proclaim current income too low by a specified amount. To tell the railroads how much income they need for maintaining the new standard of service is not the present object. That object is to inquire, as the *Railway Age* in effect inquires, whether the downward trend of rates is not a continuous drift and whether a permanent concert of the roads is not essential, (1) for a definite authentic conclusion as to what trend of rates is required, (2) for action looking to the maintenance of such tendency.

What is the fact as to the trend of rates? The average amount received for hauling a ton of freight one mile has been as follows:

Calendar Year	Receipts in Cents Per Ton-Mile, Average
1921	1.275
1922	1.176
1923	1.116
1924	1.116
1925	1.098
1926	1.082
1927	1.081

A larger or smaller proportion of low rate tonnage somewhat affects the exactness of this comparison one year with the next, but nobody can reasonably regard a persistent tendency of these figures over six years as misrepresenting the trend of rates.

President Johnson Asks

Whether the present downward trend of rates is not a continuous drift, and whether joint and co-operative action of the roads is not essential,

1—To arrive at an authentic conclusion as to what the trend of rates should be, and

2—To take action to maintain the trend in the necessary direction.

It is pointed out that average ton-mile earnings decline each year, for which decline the railroads themselves are, at least in part, responsible.

Reductions That Cost Roads Four Billions

What the railroads would have received if rates had remained at the level prevailing in 1921 is cumulative. Merely to cite this amount for the latest year may be ominous for the future but the loss is effective in every one of the years and the total is the sum of the annual losses. It is the amount which the roads would have had, but had not, for use in the various ways—such as building up surplus, plowing it into the property without charge to capital account, investing it in quick assets for "other income," and increasing dividends—factors which determine investors' appraisal of securities. The Western Railways' Committee on Public Relations in its 1928 year book, "Railroad Facts," page 76, presents the picture from which the following table is constructed:

Year	Receipts, Cents Decline Average per Ton-Mile under 1921	Receipts, Dollars Additional Earnings if 1921 Rates had stood
1922	0.98	$332,500,000
1923	0.159	656,236,000
1924	0.159	617,580,000
1925	0.178	736,589,000
1926	0.194	860,868,000
1927	0.195	835,812,000
		$4,039,585,000

More than four billions!

Undoubtedly any acute warning, through events, that a day of reckoning was at hand has been postponed by temporary circumstances under which service could be kept at the high level set in spite of the downward persistence of rates. These circumstances were mentioned by my colleague, E. B. Leigh, in an address, October 22, before the National Association of Manufacturers. Mr. Leigh, discussing the periodicity of railway expenditures on plant, spoke of the present as a transition.

Many roads, he said, had been reducing inventory—some as much as 50 per cent or more, he thought—while "The railways as a whole got inventory down 30 per cent at the end of 1925 as compared with 1920, the peak, though some of this reflects price changes. With the growth of the country and of railway plant, the amount of inventory had already turned up again in 1926 and increased further in 1927. In this series of years, then, no matter how normal the traffic handled or how excellent the job done by the roads, they have as to important factors in operating cost been living on their fat .... In that sense and to that extent, whatever it is, railway expenditures have currently been subnormal."

Mr. Leigh cites also "another temporary reserve" in "taking up the slack by efficient use of facilities." The decrease in tractive pounds per ton-mile hauled is due to efficiencies in every direction such as "progress in locomotive design, in size of cars, in road and appliances, in methods of operation and in cooperation by shippers." By this advance more transportation is performed per unit of facilities. Very large outlays, he concedes, have been applied to facilities and to the substitution of more expensive units for those scrapped, but the increase in efficiency "greatly exceeds what may be measured by cash outlays. A substantial part of it is due to more scientific operation of yards, terminals and road, better distribution of rolling stock and on the part of shippers fuller loading and prompter unloading."

In future, Mr. Leigh believes, "each enlargement of the railways' ability to perform transportation will perhaps involve proportionately smaller expenditures on property than before the war but there may never again be a time when a given augmentation of traffic can be handled with expenditures of this sort relatively so low as since 1922."

Prospect for Large Traffic Increase

To the traffic which the roads must be prepared to carry they have to add volume generated directly and indirectly by their own expanded outlays for additions, betterments and maintenance; railway purchases and railway wages alike swelling the total of all kinds of traffic. When the resumption of more rapid national growth will come is any man's guess. Mr. Leigh notes that in five years of recovery after 1893 the increase in revenue ton-miles over previous peak was 21.9 per cent and in five years of recovery after 1907, 11.6 per cent over the previous peak, whereas in five years of recovery after 1918 it was 1.8 per cent and partly estimating 1928 in five years of recovery after 1923, 2.1 per cent over the previous peak. Some decline in the normal rate of growth may prove to have resulted from the several new stabilizers often cited, but what probability is there that the change in pace is as great as these comparisons would indicate if the 10 years now ending had been normal?

Two years ago the upward swing was predicted for last autumn. The Ford plants shut down in May with depressive effect upon the whole motor vehicle industry and so on into the entire business life of our people. At this writing it is reported that the Ford production, delayed by obstacles wholly temporary, has barely passed half the daily out-put planned. Building construction, for some years heavier in the residential, public works and public utilities classifications, now figures in the forecasts as ready for expansion in the industrial and commercial column. Already freight car loadings, a significant barometer of general business, are, as I write, near a new record, with indications that, though the autumn recession will be reached without general impatience of shippers due to delays, the margin of surplus will be narrow. That the railways realize these conditions seems to be manifest from recent equipment orders and inquiries.

Already here, then, is the time when railway rates need concerted action in the study of income and rate tendencies and in sustained effort to get and to keep rate levels where future service to shippers requires them to stand.

Protection Against One Another

Railway officials, the *Railway Age* editorial states, observing the decline in rates "have begun to question whether this has not been attributed to the policy or lack of policy of the railways themselves."

In general it may be said that, if well organized, the railways can expect to exert an influence upon rate adjustments initiated by commissions or by shippers as well as upon those filed without suspension and inquiry. For both types of adjustment an eye on income is vital. Nevertheless the feeling, as the *Railway Age* remarks, has been growing that very much can be done by the roads on their own initiative.

The Interstate Commerce Commission owes its creation in 1887 primarily not to the demand for restriction upon the carriers but to the desperate need for some regime which would protect them against themselves and one another. In the 1870's and the 1880's the traffic manager's hand was free to cut rates to the point which would bring the business regardless of consequences to net revenue. Rate wars brought the roads to or beyond the edge of bankruptcy until they besought the government to help them out of the pit which they had dug for themselves. Before the Cullom Senate Committee, their first witness, Albert Fink, described as "a commissioner of the trunk lines," declared: "If the railroads cannot govern themselves, then I think it is proper that the government should step in." Rebates once abolished and rate competition practically so by the compulsory filing of tariffs unchangeable without notice, for many years, considerations of income had a steadying influence.

Attitude in Rate Discussions

Since 1920, especially since 1923, when the new excellence in service had become fully operative, an impression was widely accepted that the railway financial problem had been solved and need give nobody any more anxiety. This was the atmosphere in which rate adjustments, whether in controversy or not, were discussed and made. From the courts to the tariff subordinates in railroad and industrial offices, everyone concerned breathed that air. The Hoch-Smith resolution, for instance, limited rate reductions for distressed elements in the population to those which would not violate the adequacy-of-income provisions of Section 15-a. Would the California deciduous fruit reduction violate that? "Certainly not," was the spontaneous

mental reaction. There was no income problem—none that gave anxiety to the Commission or to the court of first appeal. In rate discussions, large and small, formal and informal, the railway traffic officials have labored under a heavy temptation to resume, though without the rebate feature, rate competition carried on with an eye not so keen to income as for many years before the war.

Suggestions of the Commission

A year ago the Railway Business Association requested Interstate Commerce Commissioners to cite data for a study of foresight in rate-making. Through their chairman they informally complied. Referring to their responsibility in respect to income they said: "The principal burden of preparing data for the Commission to enable it to carry out this burden must perforce rest upon the carriers." The letter intimated that since 1922 the railways had not exhausted their opportunity of initiative in rate revision for increased revenue. One of the Western railway executives in a public address cited situations in which he thought injustice had been and was being done the roads in various aspects of rate procedure and declared railway income too low in the public interest. In a letter to me that utterance was made the subject of comment by the Hon. Mark W. Potter, formerly a railway president, afterwards an Interstate Commerce Commissioner and subsequently a railway receiver.

Mr. Potter wrote: "It is not possible for the Commission to handle the vast multitude of situations that must be dealt with in readjusting the rate structure. Only the carriers can do that." He quotes also the statement of a commissioner in the California Growers (deciduous fruit) case, that "We must shift some of the burden now borne by agricultural products now suffering from depression to other classes of traffic." Mr. Potter adds: "It is to be noted that what the commissioner referred to was a 'shifting' and not merely a reduction to stand permanently alone. It may well be that if the carriers would go ahead and do their part, the shifting process would result in an adjustment quite satisfactory to all concerned." He thought the carriers ought to "get together," and suggested that they should regard the statement of the Commission to the Railway Business Association "as a valued help." The roads, he says, act "severally and not jointly." The Transportation Act, he points out, "contemplates a fair return upon group values. It contemplates group regard for one another."

Nation-Wide Studies and Action

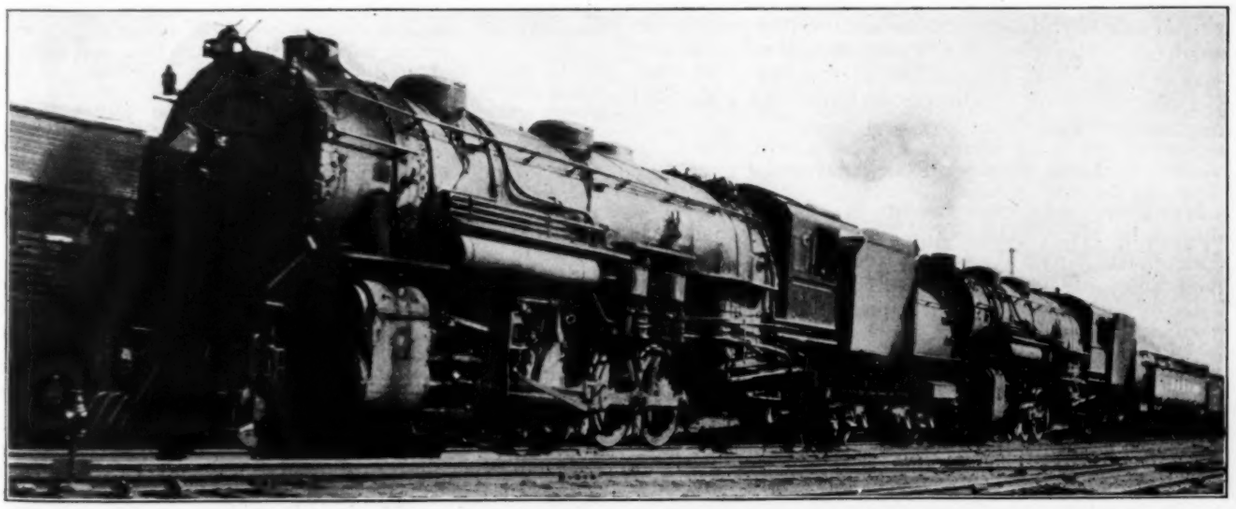
Our letter from the Commission concluded with the suggestion that to deal with the aspects involved in foresight in rate-making "the railways have large and able organizations and have the financial means to supplement such organizations in the preparation of information bearing upon the necessary lines of inquiry." The railways were urged to "initiate nation-wide studies to develop data."

Upon other phases of their task the railways have cooperated well among themselves. The *Railway Age* refers to the freight classification committees as a precedent. These in the three traffic territories are each a permanent body whose three members, though experienced traffic men of first-rate attainment in railway service, are wholly dissociated from individual railways and exert an undivided responsibility to the roads in the group as a whole.

Another precedent in a field somewhat analagous and destined to dovetail to some extent with a committee on revenue, if one were created, is the Car Service Division of the American Railway Association. Much of the improvement in service since 1920 has been due to joint distribution of cars through this now indispensable agency. The method is to maintain a continous survey of shippers' expected needs and railroads' stock of equipment as to its prospective adequacy. This is where systematic maintenance of revenue must begin. It will be pioneering. So was the work of classification committees and of the Car Service Division. Such a committee would stand guard over revenue, impressively at all times calling the attention of railways, shippers and governmental regulators to departures or tendencies to depart from practice essential for maintenance of revenue at a level of adequacy prescribed upon tangible grounds.

Self-preservation is nature's first law and our railways are in much the same position as the states in the original Confederation, which at Annapolis discussed and at Philadelphia achieved common concessions for the common defense and the common welfare.

* * * *



On the D. & R. G. W. at Colorado Springs, Colo.

"Cost Accounting" Plan Opposed

Roads say Bitney plan not real cost accounting—Ask more data from N.I.T. League witness—Bankers seek changes

WASHINGTON, D. C.

A PLAN for ascertainment of railroad "service costs" and the separation of such costs as well as of revenues and other statistics by states and rate scale territories, proposed by L. R. Bitney, statistician for the Minnesota Railroad and Warehouse Commission, was subjected to a critical analysis by representatives of the Railway Accounting Officers' Association at a hearing before Commissioner Eastman and Andrew M. Bunten, chief of the Depreciation Section, of the Interstate Commerce Commission, October 25 to 29, on the general revision of accounting rules for steam railroads, Ex Parte 91.

Mr. Bitney's plan was described as being substantially that recommended in a report of the committee on statistics and accounts of the National Association of Railroad and Utilities Commissioners, of which he is chairman, submitted to the 1926 convention of that association. Although Mr. Bitney referred to it as the "state commissions' proposed revised classification" the railroad representative sought to emphasize that it was not adopted by that association but merely received. Mr. Bitney and his counsel admitted that but said the state commissioners' association does not usually adopt committee reports and Commissioner Eastman said the commission is much more interested in finding out whether it is a good plan than in who proposes it or supports it.

Railroads Seek More Definite Information on N. I. T. League Stand

A similar question had arisen at an earlier hearing in connection with the accounting plan proposed by J. W. Roberts, president of the Roberts-Pettijohn-Wood Corporation, in the name of the National Industrial Traffic League. When Commissioner Eastman announced on October 29 that the hearing in Ex Parte 91 would be resumed on November 24, to permit the National Industrial Traffic League to present further testimony, E. R. Woodson, counsel for the Railway Accounting Officers' Association, made formal demand that the league furnish information as to the authorization for the league to be represented in the proceeding, the personnel of the committee representing the league, any reports made by that committee to the league together with the action of the league thereon, and a detailed membership list of the league.

L. R. Bitney's Plan Analyzed

Mr. Bitney was cross-examined at length regarding his plan by Mr. Woodson and Fletcher Rockwood, representing the Great Northern, after which detailed statements analyzing his plan were presented by A. L. Conrad, assistant general auditor, Atchison, Topeka & Santa Fe; V. P. Turnburke, general auditor, Great Northern, and W. B. McKinstry, comptroller, Central of Georgia, appearing for the accounting officers' association.

The railroad witnesses said that Mr. Bitney's plan is in no sense a cost accounting plan and that the separation of expenses proposed rests largely on arbitrary bases, often not defined, which would destroy the value of any "average costs" ascertained by it as bases for application to particular commodities. Estimates were also presented to show that it would impose a large additional expense for more detailed accounting and that the results attained would only lead to endless controversy whenever attempt is made to use them.

After Mr. Bitney had outlined his plan in testimony at the June hearing, Mr. Woodson had asked that cross-examination be deferred until after the carriers had had an opportunity to analyze it and had suggested that the railroads make a practical test of it if practicable. Commissioner Eastman had stated that no time could be allowed for such a test beyond September, when it was expected that the hearings would be resumed. When re-called for cross-examination Mr. Bitney said he had heard no more about a test of his plan, except that he had received a joint letter from counsel for the Great Northern and Northern Pacific asking him to apply it specifically to ascertaining the cost of a carload of grain from Montana to Minneapolis. Mr. Woodson stated that upon examination of the Bitney plan it had been found that it would be impracticable to make a test of it in the time available and that it was in such shape that the preparation of the necessary instructions and forms alone would require several months.

Before his cross-examination Mr. Bitney presented a further statement explanatory of his plan, saying in part:

Purpose of the Bitney Plan

It is our contention that service costs, determined under uniform standard rules, will greatly aid the Commission to properly determine and prescribe:

(a) Territorial limits of rate scale territories.

(b) Just and reasonable rates as between rate scale territories on a given commodity, also as between the various classes and kinds of commodities within the same rate scale territory.

From the records now maintained by the carriers, it is impossible to secure satisfactory operating costs and statistical data by states or by rate scale territories. The carriers take exceptions and object to the use of information contained in their annual reports to state commissions on the grounds that the methods used by the different carriers in the allocation and assignment of revenues and expenses are neither uniform nor proper; that the amount of revenues and expenses so reported are improperly determined and therefore not representative of the actual operating results in a particular state or a combination of states comprising a rate scale territory.

Many of the larger railway systems have lines and operate in as many as four different rate scale territories. In the Class Rate Case, I. C. C. 17000, Part 2, the carriers are proposing rate scales that as between territories vary over 100 per cent. Since the variation in rates depends upon the variation in service costs, the use of system data is subject to the same exceptions applicable to state data.

Now the question confronting the commission is this: if as contended by the carriers, no reliable cost data by states or rate scale territories is available, on what grounds are rate differentials to be justified? With no definite information as to service costs how are rates as between territories to be readjusted, if and when traffic and transportation conditions change?

Under our proposal the carriers are required to segregate and record operating costs, traffic statistics, operating statistics and property values by states and rate scale territories. From the information so recorded it will be possible to accurately determine comparative service costs in the different rate scale territories.

As stated in my previous testimony, our submission was not intended to include all the necessary rules and regulations defining the method and manner by which the charges to each primary account should be divided as between terminal and line haul services. The formulae and rules necessary to make

effective the changes and revisions we are suggesting are detail matters to be worked out in a co-operative way later on.

Having ascertained the average line haul cost per gross ton-mile; the average terminal cost for two loaded terminals for that proportion of terminal expense considered dependent on the number of cars handled, and the average terminal cost per gross ton for that proportion of terminal expense dependent on gross tons handled, yard stick costs may then be determined by converting these average gross ton-mile line haul and gross per car terminal costs to a cost per cwt.

Since the above average yard stick costs per cwt. include only such operating costs as are common to all kinds and classes of traffic, additional costs per cwt. should be added to cover the cost of special services attributable to the specific commodity under consideration.

Having obtained yard stick scales which include all the operating costs assignable to the particular commodity involved, these total cost scales may then be increased to allow an appropriate rate of return on property values.

The purpose of our proposal is to make available the basic costs, statistics and related information which, under the Dr. Lorenz formula, it is necessary to use in the determination of average yard stick costs. With this data available it is possible to determine yard stick costs of a particular commodity based upon operations of a single railway system, combined operations of a number of railway systems, or a portion of a system or number of systems, representative of a rate scale territory.

Mr. Bitney also recommended that the operating revenues be credited with an item representing the difference between the land-grant rates accorded the government and the ordinary rates, on the ground that the shippers of ordinary freight now are charged with this "loss" and that the railways actually receive compensation for the land grant reductions from the proceeds of the sale of land. It was brought out in cross examination that railways which received no land-grants receive only the reduced rates in government traffic and Mr. Bitney seemed uncertain as to whether they should show the amount of the reduction in their accounts. F. A. Barnes, assistant, director of the Bureau of Accounts, said that the land-grant rates are lawful rates just as the regular tariff rates, and asked why the revenue from such rates should be accounted for on any different basis than that from commodity rates, which represent a departure from the class rates. When Mr. Bitney said the purpose was to show the loss which must be borne by other traffic, Mr. Barnes said the difference does not represent a "loss."

Commissioner Eastman asked if the situation could not be met by crediting freight revenues with the proceeds of land sales and Mr. Bitney said he thought that should be done.

Commissioner Eastman asked if, assuming that the cost studies are full of defects, they could make the situation any worse than it now is in rate cases, when both railroads and shippers are able to bring in comparisons with other rates to serve their purpose and both make comparisons of ton-mile or car-mile earnings according to whether the commodity in question is one which loads heavy or light, Mr. Bitney said he thought the situation would be greatly improved and that his plan was proposed not as an exact method but as a means by which costs may be ascertained approximately and in a uniform manner.

Mr. Conrad's Comments

Mr. Conrad summarized his conclusions with respect to the so-called Classification of Operating Revenues and Operating Expenses submitted by the witness as follows:

(1) It is in no sense a cost accounting plan.

(2) It will not provide an actual or a complete separation of expenses between the line haul and terminal service.

(3) It does not provide a separation of the expenses between the freight and passenger service.

(4) It will not provide freight commodity transportation costs nor classified passenger service costs.

(5) It is in many respects inapplicable to practicable railroad conditions. Numerous direct allocations of accounts and expenses have been provided for which are impossible.

(6) It is incomplete for the reason that in numerous instances where apportionment is necessary the required bases are not suggested or provided.

(7) It is inadequate in that it does not reveal all elements of expense, but destroys the identity of expenditures which are of considerable proportion, i.e., injuries to persons, insurance, joint facility expenses, etc.

(8) The unit results that might be determined are only average unit expenditures and if combined for systems would be merely averages that would not in any manner indicate actual costs of transportation or operation.

(9) It destroys the comparative value of existing railway accounting data.

(10) The so called cost of transporting "company" material and employees would be attempted, but the necessary procedure has not been provided.

(11) It leaves the difficult or impossible problems for solution by others.

(12) It would introduce practices in accounting that would be confusing to railroad managements and would not serve the public interests.

Discussing various details of the plan Mr. Conrad also said in part:

The proposed freight revenue accounts would inaugurate fantastic accounting for revenues by states and as to the railroads as a whole would accomplish no purpose which is not now being more economically served by the one freight revenue account and the freight commodity statistics reported by the carriers to the Interstate Commerce Commission.

The proposed freight revenue account No. 9, provided for reporting the revenues, at full tariff rates, on governmental traffic subject to land grant deductions is to include the hypothetical revenues that the carriers could not collect from the government. A debit revenue account No. 15 is provided for cancelling the effect of these hypothetical revenue credits. If adopted, this proposal would compel carriers to misstate revenues to the extent of sundry amounts that have not been collected and can not be collected.

Classification of Operating Expenses

The witness' proposed classification of operating expenses for steam railroads, Exhibit 31, has been predicated on the accounts of the current Interstate Commerce Commission's classification of operating expenses for steam railroads, amplified to provide for a partial division of the expenses between the line haul, station, and yard functions. Clearing accounts are provided for the purpose of collecting shop and power plant expenses to be apportioned to the primary accounts. Some additional primary accounts have also been provided for the purpose of segregating station and office building maintenance and other accounts to show segregation of station and yard operating expenses between classes of service.

In theory, expenses are, in some cases to be assigned direct to line haul, station or yard service, and in other cases they are to be apportioned on the bases indicated in the right hand column opposite the account or accounts under review. Practicability in either case is not demonstrated.

The assigned yard service expenses are all classed as "Terminal" notwithstanding the fact that a substantial portion of these expenses are incurred in connection with the line haul service. The expenses contained in certain primary accounts have been classed as "Common" to line haul, station, and yard service. No provision has been made in the scheme for apportioning the "Common" accounts to line haul, station and yard service. This omission leaves the scheme incomplete.

The classification proposed in Exhibit 31 is in no sense a cost accounting plan; and while it contemplates a division of freight expenses between the line haul and terminal service, it has not been carried to the point where either of these functional or any other service costs are brought out.

Similar divisions of the operating expenses between the line haul and terminal services have been attempted in numerous test studies, and the accountants have been confronted with the inescapable fact that much of the expenses to be so divided are expenses incurred in common for these two classes of service and frequently also largely incurred in common for the freight and passenger service. The expenses that can be directly allocated to either the freight or passenger service and in turn also directly allocated to either of the line haul or terminal services, are relatively quite negligible. Therefore, these proposed divisions of expenses between the classes of service on a railroad are the old, old problem of providing formulas or bases that are representative, practical, and economical. Such a segregation of expenses is not merely a matter of sketching a

bare outline designating the accounts in which the segregated expenses are to be lodged.

In any comprehensive division of expenses between line haul and terminal services, practically all of the primary expense accounts are more or less directly involved. Few, if any, primary expense accounts can be allocated to a class of service; consequently the greater the number of expense accounts, the greater the number and variety of bases or yardsticks that must be provided for dividing the accounts between classes of service. This observation applies to the primary apportionment of the expenses between the freight and passenger service, as well as to the subsequent separate apportionments of the freight and passenger expenses between line haul and terminal services. In both cases representative apportionments of common expenses call for the compilation of a large amount of auxiliary statistical data, time studies and additional detail records of transactions not customarily recorded or tabulated in the usual railroad accounting and/or in the customary operating and traffic statistical compilations. The cost of regularly supplying these necessary additional records and statistical data would be so large as to make a continuous requirement somewhat prohibitive and an unjustifiable extravagance.

The mere preparation of a chart showing the various primary accounts for a classification may be characterized by its simplicity. A constructive, helpful recommendation would consist of providing the texts for the accounts and practical and representative bases or yardsticks for dividing the common expenses at a reasonable assembling or compilation cost. It all too frequently happens, in the discussion of cost accounting for railroads, that vague, indefinite ideas are advanced, the details apparently being considered of a trivial nature to be worked out casually.

Proposed Statistics

My conclusions regarding statistics proposed by the witness might be concisely stated by pointing out that these statistics are expensive to compile, without compensating return to the carriers. The lack of utility in the proposed statistics cannot be ignored. Public interest would not be served by creating new statistics that would be misleading or cause confusion, create misunderstanding, or that would be inaccurate or misrepresentative, and without comparative value. The proposed statistics would not disclose costs nor aid in determining costs for the reason that many of these statistics are not supplemental to the accounting.

This exhibit (Ex. 32) appears to be a report of the Committee on Statistics of the National Association of Railroad and Utilities Commissioners to the 1926 convention of that association. It is apparently not in the nature of a recommendation by that association to the Interstate Commerce Commission relating to the matters under consideration in this hearing. The committee report contains recommendations to the National Association of Railroad and Utilities Commissioners but that association did not adopt those recommendations, and merely received the report. The witness in presenting this report as Exhibit 32, and recommending the formula to the Interstate Commerce Commission is in the inconsistent position of having recommended it to his association and receiving no sanction for his report or his formula from the association now recommends it to the Interstate Commerce Commission.

Cost Accounting Impractical

The conversion of classified departmental expenditures into classified service or other costs—a condition precedent in any cost accounting plan—largely detracts from, or destroys, the usefulness of the results for supervision purposes. Such costs do not represent any distinctive class of expense and necessarily contain elements of various classes of expenditures. They do not, as a rule, represent combinations of expenses for which a single railroad department or departmental head is responsible. Therefore, the attempt to utilize these constructive costs for supervision purposes encounters the obstacle of divided responsibility. Any plan creating a condition where no one is responsible for the costs would not receive acceptance among the well informed.

The utility of basic data for comparisons would be restricted and the basic data would be scattered under any cost accounting plan. To the extent that cost accounting methods are now used in the existing classification of operating expenses, in the way of spreading shop and store expenses and certain supervision and overhead expenses, over a number of primary accounts, they tend to diminish the usefulness of these accounting results for supervision and comparative purposes. Any proposals to merge expenses in order to build up so-called cost accounts would tend to destroy the usefulness of the classifications of accounts for supervision and comparative purposes. In order to intelligently and effectively use the accounts provided under any cost accounting classification for purposes of management, it would be necessary in addition to what had been done along cost accounting lines, to restate the expense according to a classification of expenditures. Cost accounting is irreconcilable with practical railway accounting and can be accomplished only through inharmonious distribution of expenditures.

Plan Called Valueless

Mr. Turnburke said that, it is not possible to determine accurately the cost of performing particular railroad operations or of transporting a particular commodity. Furthermore, the plan proposed, while possibly slightly more detailed than the present classification of accounts, is still so far from being accurate and so full of assumptions and apportionments as to make it valueless for the purpose for which it is intended which is the determination of cost of service. In fact the method proposed is an apportionment of cost in distinction from an ascertainment of cost, he said.

Among other statements made by Mr. Turnburke were:

It must be evident that costs of transporting individual commodities as determined by Witness Bitney are not actual costs but costs based on assumed average transportation conditions and average costs for all classes of freight. The plan proposed in Exhibit 31 does not provide for any separate determination of train haul costs by commodities as affected by such important considerations as per cent of empty car movement, average load per car, direction of movement, (with or against the prevailing direction of traffic movement) density of traffic, etc. In a freight train of 80 cars there might be 80 different commodities each having a different cost, yet no attempt has been made to allow for this variation in cost.

Because of the large proportion of arbitrary apportionments necessary it is impossible to design in advance a system of accounts that will furnish a yardstick cost of service by commodities that would be of any value except as reflecting average conditions and not the conditions surrounding the transportation of the particular commodity whose cost is sought. By making special cost studies under the supervision of the commission when and as necessary greater accuracy and reliability can be secured.

Witness Bitney stated that any special cost study is unsatisfactory and does not produce representative normal results. The plan proposed would not eliminate special cost studies but make them more than ever necessary. Neither would the proposed plan produce any more reliable basic data than under the present classification nor would that plan produce more satisfactory or normal results.

The idea that system or state wide average costs based on Exhibit 31 would be more accurate than special studies is diametrically opposed to the thought of the Supreme Court of the United States on this subject. In Northern Pacific v. Department of Public Works, 268 U. S. 39, the department used the operating cost per gross ton-mile of all revenue freight to arrive at the estimated cost of handling certain log traffic in the state of Washington. The Supreme Court said,

> This was clearly erroneous. * * * In this unit cost figure no account is taken of the differences in unit cost dependent, among other things, upon differences in the length of haul; in the character of the commodity; in the configuration of the country; in the density of the traffic; in the daily loaded car movement; in the extent of the empty car movement; in the nature of the equipment employed; in the extent to which the equipment is used; in the expenditures required for its maintenance. Main line and branch line freight, interstate and intrastate, car load and less than car load, are counted alike.

The only difference between the plan proposed in Exhibit 31 and the testimony connected with it, and that condemned by the Supreme Court is that Exhibit 31 only applies the gross ton-mile cost to the line haul portion or approximately 2/3 of operating expenses (instead of to 100 per cent of operating expenses) using average costs based on other units than the gross ton-mile for the remaining 1/3 of operating expenses.

The cost apportionment such as is proposed will be nothing but an estimated average cost. But even were it an accurate cost it would not be possible to make rates upon such a basis. I am not and do not profess to be an expert at making rates but the commission is fully informed as to the proposition that cost is only one element in rate making and by no means the controlling one. Cost figures such as proposed completely ignore the inability of a portion of the traffic to pay as high rates as other traffic. They completely ignore the effect of water competition through the Panama Canal that the transcontinental carriers are constantly called upon to meet. The tendency of making rates upon the basis of any cost analysis would be to bring all rates to a common level.

As the proposed plan will not fulfill any of the five purposes claimed for it, and in view of the vast amount of detail and expense necessary to put it in operation, the commission would not be justified in adopting it. The minimum annual cost to Great Northern for compiling the information sought is $225,000. If the same accounting cost per dollar of operating revenues or expenses should be incurred by all carriers the increased accounting cost for all carriers would be from $13,000,000 to $15,000,000 per year. This money would be expended to develop a system of accounts which will lead to endless controversy whenever attempt is made to use them and the many assumptions and estimates used would make the results obtained far from conclusive. In considering this angle of the proposal, attention should be directed to the amount of detailed accounting required by inexperienced men in the field. Contrary to the testimony of Witness Bitney it is a fact that the plan proposed would be an attempt to make accountants out of employees in all branches of railroad service.

I am a staunch believer in the value of statistics and cost figures when properly used. It is my firm conviction that cost accounting as proposed by Exhibit 31 will not accomplish what its proponents expect of it, which seems to be the solution of most of the commission's regulatory problems such as the fixing of rates and divisions and determining whether the management has been efficient and prudent. Instead of casting more light upon the subject the proposed plan will not only be less illuminating but the results to be expected from its promulgation will be positively vicious because with the backing of the commission there will be a great weight of authority given to a defective and misleading series of average costs.

Continuance of Special Studies Advocated

The best way of solving the problem of cost accounting for the movement of individual commodities over a railroad is to continue as heretofore by relying upon special cost studies made under the supervision of the Interstate Commerce Commission and the scrutiny of the state commissions. It is only by means of such special studies that the facts surrounding the movement of a particular commodity can be revealed. The commission in its decisions has many times stated that costs at best are estimates, but this is no reason why we should not seek the most accurate estimates. Exhibit 31 will not produce the best possible estimate, nor anything approaching the desideratum no matter how arresting the plan may appear to be. Furthermore the use of these average costs will not eliminate special cost studies but make them even more necessary in order to show where the particular traffic varies from the average of all traffic.

Mr. McKinstry said in part:

Any average cost figures determined under such a plan, purporting to show the cost of handling different classes of freight, would be worthless and misleading. With different terminals, an average cost is non-existent unless it be an average of averages. No two terminals are alike; therefore, the costs would not be the same at different terminals. Different classes of freight originate at different stations. Less carload freight is handled by the same men who handle some carload freight. Carload freight is usually loaded or unloaded by shippers. The office work of both carload and less carload is done by the same clerical force. I have heard this matter discussed many times during the past 25 years, but I have never yet seen a formula that provided for the separation of terminal and line expenses that could not properly be criticised.

The term "cost accounting," if applied to the proposed plan, would be a misnomer. The methods advocated by Mr. Bitney would produce merely average costs that would be controversial, would not be conclusive, could not confidently be applied to different commodities, and would not be useful or helpful to railroad managements. Special studies would not be eliminated.

Other Testimony

J. E. Slater, secretary and treasurer of the American Brown-Boveri Electric Corporation, took the stand to reply to a statement made at a previous hearing by J. W. Roberts, who after Mr. Slater had put into the record in March a criticism of Mr. Roberts' plan of accounting, had referred to it as a "joke" on the National Industrial Traffic League. He said Mr. Roberts had insinuated that he was really in the employ of a railroad at the time of his testimony, whereas he had merely appeared as a witness in a rate case to defend some testimony he had given in the case before he left the New York, New Haven & Hartford, and that Mr. Roberts and the league had been informed before he testified that what he said would not be helpful to the Roberts plan. Notwithstanding this, he said, they had repeated their request that he testify and he took exception to the inference that he had changed his views or had been influenced in any way.

German Plan Described

Dr. M. O. Lorenz, director of the Bureau of Statistics of the Interstate Commerce Commission, put into the record a memorandum describing what he termed a system of "cost-finding" recently adopted by the German National Railways, which had already been submitted to the parties to the proceeding. He was cross-examined by Mr. Woodson, who brought out that the German railways are practically a monopoly, that they have a much larger proportion of passenger traffic than American railways, and that the German plan as described does not disclose the cost of service of any particular commodity. Dr. Lorenz insisted, however, that the plan does include some separation of expense not made by the American accounting system and that the Germans plan to distribute the expenses to trains of different classes as units of performance and then, after ascertaining costs per gross ton, to study the use made of the trains by different commercial products. He admitted that the allocations depend to some extent on the use of arbitrary factors but said that to say they are arbitrary is not to say they are not reasonable or useful. When Mr. Woodson asked if the plan does not represent an operating expense analysis rather than a plan of cost accounting Dr. Lorenz said the German railway system has a bureau engaged in making special studies based on the information gained for use in rate cases, etc.

Mr. Woodson asked Dr. Lorenz if he had made any studies as to the effect that economies in fuel consumption in freight service may have had in recent years on the results of the use of the fuel basis of allocating expenses in the commission's formula for the separation of freight and passenger expenses. He said he had not and was not sure what the effect would be.

Bankers Urge Classification for Fixed Charges

At the hearing on October 25 representatives of the Savings Bank Association of the State of New York, appearing also for the National Association of Owners of Railroad and Public Utility Securities, advocated changes in the classification to afford a ready and authoritative ascertainment from railroad reports of the amount of fixed charges and the income available for fixed charges.

P. A. Benson, secretary of the Dime Savings Bank of Brooklyn, and president of the Savings Banks Association of the State of New York, stated that the latter association consists of 149 savings banks with resources of $4,800,000,000, of which approximately 12½ per cent, or $600,000,000, was invested in railroad bonds on July 1 of this year. Such investments are made, he said, under a very old New York statute which, besides mentioning a number of railroads by name, requires that a railroad must have capital stock outstanding to the extent of at least one-third of its funded debt, and that it must earn or pay in dividends an amount at least equal to 4 per cent of all of its outstanding capital stock. There are other provisions of the law, he continued, which experience has shown tend to keep off the legal list in New York many excellent railroad bonds.

He stated that his association, cooperating with the Legislative Commission, has for some time been engaged upon the framing of a new law which will contain a proper yardstick to govern these investments. Such a

yardstick is that a railroad must earn its fixed charges at least one and one-half times for a period of years. "To make our proposed bill concise and definite," he said, "we wish to have authoritative designations of (1) Railway operating revenues, (2) Income available for fixed charges, (3) Fixed charges, (4) Income after fixed charges, but before contingent bond interest, and (5) Net income (available for dividends and other corporate purposes)."

According to Mr. Benson, the present form of income statement prescribed by the commission does not in all cases group amounts under such designations, and while by a rearrangement of the figures appearing in the present statement the same results may be obtained, it would be much more satisfactory if the statement could be changed to meet the requirements of the proposed law. If this is not done it will be necessary to state in detail all items which go to make up fixed charges and other totals mentioned. Mr. Benson stated further that "it is important to the railroads, to the shippers and to the public at large that investment of funds in railroad bonds be encouraged, that the laws governing such investment be sound and yet as simple as possible, and that the income accounts prescribed by the Interstate Commerce Commission be in such form as will furnish investors with accurate information regarding income and fixed charges."

George A. Young, a member of the firm of R. L. Day & Co., stated that savings bank legislation in other states has often been modeled after the New York statutes, and that the proposed law is such an improvement over the old that other states will, very likely, adopt similar laws. He stated further that "every investor in railroad bonds wishes to know how the earning protection back of his investment compares with that which safeguards other railroad securities. This he cannot now be sure of because of the lack of a uniform and specific statement of earnings in their relation to fixed charges." Adoption by the commission of the recommendations of the Savings Bank Association will not necessitate the compilation of additional statistics, he said, but will merely mean the rearrangement of the order of some of the accounts and the insertion of additional footings.

Mr. Young stated that the proposed New York statute will result in substantial benefit to railroads in a number of respects. Roads will no longer be compelled to pay unearned dividends in order that their bonds may continue to be eligible for savings bank and trust fund purchase. They will be permitted to issue no par stock, which is not provided for under the present New York savings bank investment statute. Many roads which are not now in position to issue bonds eligible for New York savings bank purchase will find themselves in position to do so. "The existing New York statute," he said, "limits very much the kind of mortgage security that is eligible for savings bank investment. A refunding mortgage, in order to be eligible under the present law, must cover mileage 25 per cent in excess of that covered by any underlying lien. The bonds, moreover, must mature at a later date than the maturity of any underlying lien. There are one or two other restrictions of minor importance, but those two really control the situation." The proposed statute would wipe out all mortgage restrictions, he continued, and say that any mortgage bond obligation of a road which meets the earnings and dividend requirements shall be available for savings bank investments. Further, that any unsecured debenture or income bond, the obligation of a road which has earned twice or more its fixed charges over a prescribed term of years shall be legal.

John E. White, of the National City Company, New York, said that one of the first considerations regarding the safety of investment in the securities of corporations is the question by what margin of safety the fixed charges may be earned. He considered it a safe basis that a railroad corporation, eligible in other respects, shall have income available in an amount one and one-half times its fixed charges. In the event the commission rearranges the income statement as recommended, he said it would not be necessary for the new law to set up definitions of terms from which the amount of income available for fixed charges may be determined and what shall constitute fixed charges, and the statute would be framed to use the commission's definitions. Mr. White then went into detailed discussion of various changes recommended in the income statement. Substantially, such changes consist of rearrangement of present accounts and a subdivision of interest on funded debt into fixed interest on funded debt and contingent interest on funded debt.

* * * *

On the Santa Fe

The Growth of Traffic Demands the Reconstruction of Old Bridges

Bridge and Building Association Concludes Convention

The maintenance of water stations, the wrecking of railway buildings and the placing of concrete slabs among subjects considered

THE proceedings of the opening sessions of the thirty-eighth annual convention of the American Railway Bridge and Building Association, which was held at Boston, Mass., on October 23-25, were presented in the *Railway Age* of last week, pages 811-817. In that issue appeared abstracts of reports on the use of motor trucks for handling bridge and building materials, the placing of concrete pipe by jacking or tunneling, means of stimulating co-operation between store department and field forces and the control of motor cars to prevent accidents. The remainder of the proceedings, including reports on the painting of railway buildings; the organization and equipment for handling emergency bridge, building and water service work; the operation and maintenance of water stations and the placing of concrete unit-built slabs for various purposes, together with a paper on the wrecking and salvaging of railway buildings, by W. T. Krausch, engineer of buildings, C. B. & Q., Chicago, are abstracted below.

The following suggestions were presented by the Committee on Subjects for consideration by committees for the ensuing year: 1. The Selection and Training of Men for the Position of Foreman. 2. Wearing Surfaces for Passenger and Freight Platforms. 3. The Relative Economy of Concrete Mixes and Practical Tests for Concrete Aggregates. 4. Reducing the Cost of Maintaining Roadway Buildings and Small Stations. 5. The Inspection and Maintenance of Track Scales. 6. The Maintenance of Inclines and other Water Transfer Facilities. 7. The Protection of Underground Lines from Deterioration. 8. The Elimination of Accidents to Bridge and Building Men Working Off the Ground.

At the concluding session of the convention the following officers were elected to serve for the ensuing year: president, Maro Johnson, assistant engineer, Illinois Central, Chicago; first vice-president, J. S. Huntoon, assistant bridge engineer, Michigan Central, Detroit, Mich.; second vice-president, C. S. Heritage, bridge engineer, Kansas City Southern, Kansas City, Mo.; third vice-president, A. I. Gauthier, supervisor bridges and buildings, B. & M., Concord N. H.; fourth vice-president, H. I. Benjamin, assistant engineer of bridges, Southern Pacific, San Francisco, Cal.; secretary-treasurer, C. A. Lichty, (re-elected) inspector, C. & N. W., Chicago; assistant secretary-treasurer, F. E. Weise, (re-elected) chief clerk, engineering department, C. M. St. P. & P., Chicago; directors, W. A. Batey, general inspector bridges and buildings, U. P., Omaha, Neb.; F. W. Hillman, assistant engineer maintenance of way, C. & N. W., Chicago and G. A. Rodman, general supervisor bridges and buildings, N. Y., N. H., & H., New Haven, Conn. New Orleans was selected as the location for the next convention.

The Painting of Railway Stations and Allied Buildings

A committee, of which K. Peabody, general supervisor of buildings, New York Central, was chairman, reported on the advantages of a program of work which will permit the employment of painting gangs during the entire year and thus build up an organization of experienced workmen. The fundamentals of spray painting were discussed and considerable attention was given to the painting of the interiors of large passenger stations. This report follows in part:

If the painting of buildings is done in a haphazard way, the general effect is unsatisfactory and much time

will be lost moving back and forth between more or less widely separated places. A newly painted structure among buildings that are greatly in need of paint attracts undue attention to the shabby condition of its neighbors. To remedy such undesirable conditions, it is necessary to lay out each season's work in such a way that all the buildings along a given stretch of road will be painted and then to begin the next season's work where the previous season's work ended.

Repairs should be made to all buildings before the painting is begun, so that no unsightly patching and spot painting will be necessary. This requires a program of carpentry, sheet metal and other repairs that shall be in harmony with the painting program. Such repairs should be sufficient to carry the structure without further attention for as long a time as it is anticipated that the new coat of paint will last.

The question as to whether separate gangs should be organized for bridge painting as distinguished from building painting is influenced greatly by local conditions. On some roads the bridge painting is done by gangs which take care of both the repair and painting of steel bridges; some use separate bridge-painting gangs for the larger structures and have the smaller bridges painted by the house-painting gangs in connection with their regular schedules, while still others use their bridge-painting gangs, during the winter and at other times when not employed at painting, for renewing ties, laying concrete and other work. A gang used in this way must be in charge of a good all-around foreman, but such a plan aids in keeping the gangs employed throughout the year and leads to greater efficiency and loyalty on the part of the men.

On roads where the volume of work warrants, the building work should be handled by a separate painting organization. Men so engaged are working among the traveling public a great deal of the time. They are often approached for information and should present a cleaner and neater appearance than is necessary in bridge work. In station work, it is more necessary that the men be trained to understand and guard against damage and accidents to travelers and the general public, in addition to avoiding injury to themselves and their gang mates.

The interiors of large structures, such as office buildings, large freight or passenger stations and shops, should be painted in the winter months. Painting the interior of other passenger stations, freight houses and roadway structures should be done on the regular schedule, both to avoid the expense of moving back to complete the unfinished work and to eliminate a second period of discomfort to those using the facilities.

The most economical way to get gangs to and from work depends upon the local conditions. In large terminals, where there are many buildings near together, it is usually possible to have the paint and the painting equipment moved to and from the several buildings by motor trucks. For general work out on the line, gangs should be worked from boarding cars. All boarding car gangs should be provided with motor cars for transporting men, material and equipment between the boarding cars and the work in hand.

The general belief appears to be that it is better to buy ready-mixed paints, although such information as we have gathered indicates that ingredients can be bought and paints mixed by railroads that have plants properly equipped for doing the work at a cost uniformly less than the cost of ready-mixed paints made to the same specifications. This applied only to mixing the standard colors that are used in large quantities. Any attempt to mix many different colors, in a small plant of limited equipment, will result in higher cost on account of the frequent cleaning of the mixers and mills, made necessary in handling small batches of different colors.

The prejudice that exists generally against painting structures built of brick, stone or concrete is due to the fact that, in themselves, such materials are decorative, although structures of common brick often become unsightly through the disintegration of the softer bricks and from other causes. There are many good paints that are made especially for this use, and as a rule it will prove most satisfactory to buy such paints and apply them as specified by the manufacturer.

The colors for interior painting are usually chosen with a view to producing a pleasing decorative effect, while the vastly more important consideration of interior illumination is given little thought. Badly lighted rooms are a fruitful cause of eye strain and impaired vision for those who work therein. Dark corners and closets are an invitation to filth and untidiness.

Spray painting is a subject by itself and should be handled as such, but it is a method of station painting that is coming into more general use each year. The equipment should be selected from among the many different outfits furnished by reliable and experienced manufacturers, care being taken that the equipment chosen is capable of actually atomizing the paint.

Home-made equipment is bad and discredits spray painting. Given proper equipment and competent operators the spray method will do first-class work with little or no additional use of material and at a very considerable saving in labor cost.

Discussion

It was evident from the discussion of this report that one of the essentials of good painting is to put the work in the hands of intelligent and competent foremen and inspectors. This point was stressed particularly by A. H. Sabin, (National Lead Co.), who also dwelt on the importance of securing a high quality of paint or paint materials. In this latter respect he said, "The quality of paint is of first importance, whether the paint is purchased ready mixed or in its elements and mixed on the job. If bought ready mixed, it should be on definite specifications, with the understanding that the company furnishing the paint will be held strictly accountable." Emphasis was also put on the magnitude of the quantity of paint used in this country annually, and the false economy of using an inferior paint when so large a proportion of the painting cost is for labor.

Methods of applying paint were not discussed, although on a question by G. C. McCue (C. N.) as to whether masks should be used by the operators of paint spray guns, several replied that this was generally left to the discretion of the operator, but that masks were most effective on interior work.

Emergency Bridge, Building and Water Service Work

Recognizing the waste which may occur either through the maintenance of excess stocks of material for use in emergencies, or the neglect of these materials, on the one hand, and the delays to traffic occasioned by inadequate stocks or faulty organization for emergencies on the other, a committee, of which C. D. Turley, supervisor of track, I. C., was chairman, devoted its study to the problem of securing maximum protection at mini-

mum cost and stressed the necessity of co-operation between the maintenance, operation and store departments in these matters. This report follows in abstract.

The committee feels that its report should cover an operating division, and it is assumed that a division organization can handle any ordinary emergency; that in cases of more severe damage, it can call on adjoining divisions for assistance, and that in extreme cases, system forces, if available, can be called into service.

It is the duty of the supply department to be able to furnish promptly equipment and material in sufficient quantities to meet emergency requirements. Emergency stocks should be centrally located so that they are available for immediate use at any point on the division. Emergency material, after a certain length of time, should be used on regular maintenance work and replaced by new material, thereby preventing loss from deterioration.

Studies made by the American Railway Association and by the United States Department of Commerce disclose that it costs between 15 and 20 cents on every dollar of investment in material and supplies to carry these stocks. It is highly important, therefore, to keep emergency stocks at the minimum, which calls for close co-operation between the maintenance and supply departments.

Because of the similarity between bridge and building work, it is felt that gangs should be organized and equipped to handle both classes of work in emergencies. Exceptions to this practice are advisable, however, in the case of large terminals where there is an unusually large number of buildings. The pile driver and outfit cars of the pile driver gang working on the division should never be spurred out, but should always be placed on a track connected with the main line by a switch, so that the work train can pick up the pile driver and outfit cars quickly. Small gangs, assigned to districts to take care of minor repairs to timber structures and responsible for structures in general, should be equipped with motor cars so that they can be assembled with the least possible delay.

Supplies of emergency bridge material should be of at least sufficient quantity to replace a 120-ft. timber trestle, in addition to riprap, blocking and other material which might be needed in case of a washout or damage to bridges. Storekeepers usually have on hand or can quickly procure material for replacing buildings. In cases where it is exceptionally important to replace a structure promptly, it may sometimes be advisable to purchase materials locally. To avoid unnecessary delays, there must be close co-ordination among the chief dispatcher, the division engineer and the supervisor of bridges and buildings.

During periods of emergency men are working under an unusual strain and for long periods at a time. If possible, their outfits and camp cars should be near at hand so that, if there are sufficient men to divide into shifts, those not working may have proper rest. Hot coffee and food should be served at intervals in order to keep up the spirits and morale of the men, as there is nothing so discouraging as to work under adverse conditions on an empty stomach.

It is usually advisable to maintain a separate organization for water service emergency work, under the direction of the supervisor of water service. He should have at least one division gang equipped with a camp outfit, motor car, tool car and all necessary equipment for the handling of ordinary repair jobs. In addition, he will ordinarily have repairmen at several points, and these men, in most cases, should be supplied with motor cars and automobiles.

In addition to the material carried by the division gang for running repairs, standard replacement material should be carried in stock at the division storehouse. These should include a small amount of each kind and size of pipe in service, split sleeve couplings for all sizes of pipe larger than 4-in., and one complete water column of each make and size used on the division, because different makes and sizes cannot be interchanged.

When oil is used for locomotive fuel, it is advisable to keep duplicate pumps for important water and oil stations, so that in case of a breakdown all that is necessary is to unbolt the flanges, remove the pump and put in the reserve pump. Duplicate parts for oil columns should also be kept on hand, especially the angle valves used in many oil columns. Where steam pumps are used, a reserve boiler, completely fitted up and ready to ship, should be held in reserve; also a pump, with all necessary fittings to connect with any size line in service, should be available, particularly for outlying stations.

All necessary tools should be provided. Two important instruments which should also be provided are an electric pipe locator and an electric leak locator, as great savings can be effected by these instruments. Another useful instrument is a dipping needle for locating curb boxes and dead ends of pipe lines. These instruments are costly, but frequently the saving attained on one job alone is more than sufficient to pay their cost.

Discussion

The discussion of this subject brought out a number of interesting phases of emergency work and methods, and many instances were cited to illustrate the effectiveness of both special organizations and special preparedness measures. Dealing with the subject of organization, C. R. Knowles (I. C.) said, "The main thing is a good organization. So far as personnel is concerned, I fell that any special organization for emergency work will depend largely upon the spirit and morale of the regular maintenance organization." He then made a plea for closer co-operation between departments in emergency, following which, C. W. Wright (L. I.) stressed the importance of maintaining adequate emergency supplies, as well as having a well train organization.

Commenting on emergency equipment for the water service department, O. C. Anderson (S. P.) suggested the addition of a valve reseating machine, and in this he was upheld by W. A. Batey (U. P.); both men citing instances where this tool proved most effective in emergencies. H. A. Gerst (G. N.) suggested that sufficient bridge material to replace 200 ft. of timber trestle to be kept on hand instead of for a 120-ft. structure as suggested by the committee, but in reply, chairman Turley pointed out that material for a 120-ft. structure was recommended because it just made two carloads and was sufficient to keep the men busy until other material could be secured.

Considerable discussion developed on the question whether emergency trestle timbers should be treated, the general opinion being that where treated structures are the rule on a road, it is best to have treated emergency materials, cut to standard so as to preclude framing in the field. It was also pointed out that this practice would save rotating emergency supplies. Where most structures are of untreated material, however, it was generally recommended that emergency stocks be untreated or consist of both treated and untreated materials.

While not specifically mentioned in the report, the value of having on hand, bags for sand was discussed at length. Several types of bags were mentioned and recommended as effective, but it was generally felt that, regardless of the type of bag, it was more economical to have standing orders for bags with cement manufacturers and bag manufacturers than to attempt to keep a large stock of them on hand.

The Wrecking and Salvaging of Railroad Buildings

By W. T. Krausch

Engineer of Buildings, Chicago, Burlington & Quincy, Chicago

A careful survey of the facilities to be wrecked should be made by thoroughly competent men in order to determine the best, safest and most economical method of performing the work. The equipment and tools to be used, together with the methods, must be considered carefully in order to salvage the materials and equipment and to handle the rubbish to the best advantage. In some cases, it is possible to avoid the rehandling of materials by loading them directly into cars or trucks; shipping the salvaged materials to the point

where they are to be used or to the storehouse, the scrap to the scrap dock, and the rubbish to a point previously arranged for.

In some cases, salvaged materials such as lumber, pipe and fittings, heating, plumbing and electrical fixtures, structural steel, window sash, doors and hardware, can be prepared ready for use and classified before shipment. Bricks should, if possible, be thoroughly cleaned so that they will be fit for use in other work. The salvage on bricks depends, primarily, on the kind of mortar in which they were laid, and secondarily, on whether it is advisable to clean them at the site, at the point of use or at the point of storage; this is an important matter because it involves rehandling not only the salvaged material but the rubbish as well in the latter two cases.

Before proceeding with the work, all pipe lines must be disconnected on the outside, properly protected and the lines rearranged or abandoned. It is customary to remove the plumbing, heating and lighting equipment, together with any elevators, sprinkler systems, boilers and machinery, prior to the wrecking of the structure itself in order to protect them from damage. It is also important, when the salvaged materials are to be used in the construction of another building, that plans or marking diagrams be prepared to show clearly where the various parts and materials are to be used in the new structure, to assist in reassembling them in the new location with the least delay and expense.

If the salvaged materials and equipment are to be placed in store stock, complete detailed lists must be furnished the store department and all other departments interested, indicating clearly the quantities, size and kinds of materials and equipment; in addition, proper credit must be ascertained in order that the accounting may be correct. In shipping materials into store stock, it is important that a canvass be made of the prospective use of the various kinds of materials, so that, in shipping from the store stock, the transportation cost may be taken into consideration.

In handling the rubbish, it is always found that the bulk increases perceptibly and careful estimates must be made in order to determine definitely the manner of its disposal. It is also important to select the proper equipment for handling the salvaged materials and wreckage. In some cases it is advisable to remove the brick from the walls directly into cars by means of chutes, using open-side and open-end cars in order that unloaders may drag the materials off the cars. In other cases, it may not be worth while to clean the bricks and they may be used for filling at the point of use.

Wrecking and salvaging must be done under the immediate supervision of a competent foreman in charge of men familiar with the work. The hazards of wrecking are high, as is indicated by the insurance rate of about $19 per $100 for labor engaged in this work.

Discussion

In opening the discussion of this report, A. B. Scowden (B. & O.) described a wrecking operation in which the best estimate that the railway could make of the cost of wrecking the structure with company forces indicated that this cost would exceed the salvage value of the material by $5,000. Bids were then solicited from several contractors and a contract was let to a professional wrecker who offered $6,000 for the privilege of dismantling the building and removing the materials. He cited this instance in support of his contention that professional wreckers can usually do this work more economically than company forces. In rebuttal, Mr. Krausch cited several instances where his road has wrecked buildings more economically than the work could be contracted for. He contended that every wrecking job is a special problem which must be considered by itself.

The Operation and Maintenance of Water Stations

A committee report, presented by Chairman R. C. Bardwell, superintendent of water service, Chesapeake & Ohio, stressed the value of an organization of competent supervisors and skilled workmen under the direction of a system officer responsible for the proper functioning of the water service. The programming of maintenance work was recommended and attention was called to the value of complete records of each station in the preparation of the annual programs.

A suitable organization with definite responsibility for the proper understanding and carrying out of the duties is of first importance in railway water-supply work where the immense distances and large territories covered eliminate the possibility of constant supervision. The definite assignment of a system officer to this work has well repaid the roads on which such organizations are in effect.

A reliable and experienced man should be assigned to each division with definite responsibility for general supervision of the water stations, and with sufficient office assistance to prevent the waste of his time in handling clerical work. Where pumping plants are provided with attendants, the operator is usually held directly responsible for the proper operation of the facilities and also for the minor repairs which can be handled conveniently in connection with his other duties. However, these positions are usually poorly paid and it is advisable, in most cases, to arrange for a frequent check of their work by a qualified mechanic. It has been found to be the best practice to assign definite territories to road mechanics or repairmen, which positions carry equitable rates and hold experienced and qualified men. The instruction of the pumper in the economical handling of the equipment comes under the jurisdiction of these men.

Heavy maintenance and repairs, such as for tank, pumping equipment, or large pipe line renewals, can best be carried out by an experienced crew, equipped with suitable tools. On some systems, it is the practice to have special water supply forces, consisting of a foreman, mechanics and laborers, with necessary camp cars and equipment, assigned to heavy divisions, while on others the heavy repairs are handled by the bridge and building forces in connection with their other duties. The use of experienced force, system gangs have been organized to be assigned in railroads that, where there is not sufficient heavy repair work on one division to warrant the expense of such a force, system gangs have been organized to be assigned in accordance with a prearranged program and budget.

A fundamental feature in controlling water supply maintenance expenditures is the proper programming of the heavy maintenance work. The funds for general railway maintenance work are limited on all railroads, and a well-considered and balanced annual program is necessary if the water service is to receive its share.

All progressive supply departments are now striving to maintain roadway material stocks at a minimum, consistent with safe operation, and the co-operation of the water supply forces with the other departments is essential to the reduction of the great expense of unused material. Emergency material may easily get out of control without an occasional check of the actual amount on hand.

On many railroads, the operating supplies, such as oil, waste, small tools, etc., are delivered by monthly or bi-monthly supply train. This has proved very successful where the supervisor knows his requirements and accompanies the supply train personally or has a dependable representative present.

The division supervisor and the general office should have detailed records of each water station. Without this information, plans for maintenance are seriously handicapped.

Before an intelligent recommendation can be made for improvements in operation, it is necessary that present and past costs be known as accurately as possible for both operation and maintenance. The water consumption and prospective requirements should also be a matter of record for future planning and comparison. Comparison of the monthly summaries will indicate the general trend of busi-

ness and traffic movements which are dependent upon water supply, and will frequently develop instances where economies may be effected. These statments also afford a valuable comparison of the cost of operating the various types of power and pumping units and permit intelligent recommendation for improvements involving charges to capital expenditures.

Orderliness and cleanliness are of first importance in any railway water station. It may be possible to secure efficient results in a slovenly and ill-kept plant, but the possibility is greatly in favor of the neat station.

Maintenance must be handled with a similar view of doing everything possible to prevent delays to train movement. Where duplicate or stand-by units are provided, these should be operated at such intervals as to make sure that dependable service can be expected when needed. Water waste is frequently a source of great loss and its correction affords considerable opportunity for appreciable saving and economy. Care must be taken on the northern lines to have frost protection facilities carefully inspected and placed in suitable condition before cold weather. Fire protection facilities must be kept in a highly efficient condition at all times, and the station heating and plumbing facilities must be kept in good repair.

The best of mechanical facilities will function only in a perfunctory manner or fail entirely if not followed up by a careful check system. It has been found that an organization, with a definite responsibility, is the first essential to the successful and economical operation and maintenance of a railway water station.

Discussion

The discussion of this report showed that the convention was in complete agreement with the committee. The discussion stressed the advantages of a distinct water service department, the need for greater standardization of terms and equipment, the importance of a definite water service program, and the practice of metering. On the first subject, A. O. Bowers (H.V.) pointed out the special character of water service and outlined the reasons which brought about a separate water service department on his road as well as on many other roads. O. C. Anderson (S.P.) stressed the necessity for specialists in the water service department, and in this he was supported by chairman Bardwell, who pointed out how his road is training men for water service work.

J. P. Canty (B. & M.), C. R. Knowles (I.C.) and chairman Bardwell were among those who stressed the desirability of standardizing the names applied to water service equipment and the titles of water service employees. They also pointed out the advantages of greater standardization of tools and equipment, including pumps, boilers, pipe sizes, etc., among which were those of reduced stocks and more efficient maintenance.

W. T. Krausch (C. B. & Q.) brought out the importance of making water service improvements to effect greater economies, and the necessity of knowing that the greatest efficiency is being secured from existing equipment, while Mr. Knowles paid particular attention to the importance of a carefully prepared water service maintenance program. On this subject he said in part as follows: "A general maintenance program should be made and followed each year, covering the usual running repairs and including all heavy repairs and renewals. It is not to be expected that a program of this kind will be followed to the letter. Its purpose is rather to serve as a 'yardstick' from which the condition of the various water stations may be known at all times, and from which can be determined the repairs necessary to maintain them in a safe and economical operating condition."

From the number who took part in the discussion of the advisability of metering railway water supplies, it was evident that while the practice is not followed generally, most of those present were in favor of metering, particularly with the idea of checking the efficiency of equipment, measuring losses in pipe lines and water containers, and reducing waste by the employees of using departments. Chairman Bardwell said that purchased water is usually metered, and several members pointed out the extensive use of meters in connection with water treating plants and at the points of greatest water consumption. Among these were mentioned round houses, boiler washing plants and stock yard facilities. In order to prevent waste at stock yards, F. P. Farrell (M.P.) cited the use of a master valve in the stock agents office at a certain point in his road.

The Construction and Placing of Concrete Slabs

The use of precast slabs and other units for the decks of steel bridges, concrete trestles and track-elevation subways, as well as for foundations of railroad crossings and planks for highway grade crossings, was discussed in the report of a committee of which H. A. Gerst, assistant bridge engineer, Great Northern, was chairman. The report which is abstracted below, called attention to the precautions to be taken in the design, construction and installation of these units for the various purposes for which they are used.

The difficulty of casting concrete decks in place under traffic has resulted in the adoption of precast slabs that can be moved into place quickly and permit traffic to be turned over the structure in the shortest possible time. In order to provide for easy handling, most deck slabs are comparatively short, and, of course, the shorter the slabs the greater is the number of transverse joints.

A majority of the designs show beveled edges of the slabs so that when the slabs are given a clearance of about ¼ in. on the girders, this allows a ¼-in. joint at the top of the slabs. The lower inch or so of the joint is calked with oakum and the joint is then filled to the top with an asphaltic preparation or cement mortar. The asphaltic joint is waterproof and also allows sufficient movement with the deflection of the girders to minimize the tendency of the slabs to creep. Anchorage of the slabs has been accomplished by riveting or bolting angle or plate clips to the ends of the girders to engage the end slabs. It is good practice to anchor the slabs to the steel girders longitudinally to prevent the opening up of the joints, even when they are filled as above described.

The slabs are usually handled by a locomotive crane, which progresses over the bridge on a track which is laid directly on the newly placed slabs. Where practicable, with double track, the cost and time of erection will be greatly reduced by taking one track out of service.

In most of the designs examined, the waterproofing is limited to painting the top surface of the slabs with an asphaltic or tar paint. One road specifies coal tar, kerosene and cement for this purpose. Another road specifies the use of an integral waterproofing material in the body of the concrete. None of the plans examined requires a fabric or ply waterproofing.

Concrete slabs for trestles are confined more or less to those roads traversing the Mississippi valley. Panel lengths vary from 14 to 18 ft., center to center of bents, for slabs placed on piling; in other words, the lengths approximate the height above ground. For greater heights or panel lengths, double pile bents or concrete piers are used.

A few roads, notably the Canadian National, have developed "T" beam slabs for spans up to nearly 30 ft. overall, which slabs generally have a width of 6 ft. 6 in. An interesting detail of these "T" beam slabs is the separate parapet sections, which are precast in 7-ft. lengths and doweled to the main slabs.

Standard practice on most roads calls for slabs from 6 ft. 6 in. to 7 ft. 10 in. in width, or two per track, resulting in a joint under the center line of the track. In some cases these longitudinal joints are covered with 3/16-in. plates, anchored to the slabs to prevent the ballast from working through. This same method is used for end joints on one road, although generally the transverse joints over caps or piers are filled with a waterproofing material such as oakum, sand and pitch, or an asphalt mastic.

The most satisfactory results have been obtained when slabs are precast at a central yard where substantial platforms can be provided. This prevents warped or twisted slabs, which

sometimes occur when slabs are built at the site on temporary foundations. The slabs can be hauled almost any distance on flat cars and are readily handled from cars direct to the final location in the bridge. Precast slabs of rectangular and "T" sections have been used on the Norfolk & Western on creosoted wooden double-pile bents with precast concrete caps. Precast slabs were also used by the Wabash at Detroit on wood piles in rebuilding an approach to a car ferry landing apron.

The elevation of the tracks of the railroads over the arteries of heavy vehicular traffic created a demand for an economical and permanent type of over-crossing, and the precast reinforced concrete deck slab and cross-girder were developed. This type of subway floor soon became popular on account of the relatively small amount of noise resulting from the passage of traffic over it.

The great majority of the subways of the precast unit slab type of deck are waterproofed by the use of several piles of felt and fabric, protected by a layer of asphalt mastic about 1½ in. in thickness, or by a covering of reinforced concrete about 2 in. in thickness.

Crossing Foundation Slabs

The New York, Chicago & St. Louis has had considerable experience with slabs under railroad grade crossings. A slab crossing was placed in 1927 at Spriggsboro, Ind., at an angle of 37 deg. The slab is 10 ft. by 16 ft. 4 in. in plan and is 15 in. thick. There were 7.5 cu. yd. of concrete in the slab, and the estimated cost in place was $509, not including 6 in. of cinder backfill, and the ballast on top of the slab. Another single-track crossing installed in 1925 at Lorain, Ohio, at practically a 90 deg. angle, is similar in design and construction, except that the slab is 10 ft. square. The cost of this slab in place was $302.

In 1927, the Great Northern constructed a two-unit concrete slab base under its crossing with the Northern Pacific at State Line Tower, Wis. Each slab is 8 ft. by 16 ft. in plan, and 16 in. thick, for a crossing angle of 71 deg. The cost was $24.81 per cu. yd. of concrete in place.

Reinforced concrete slabs 10 ft. by 12 ft. in plan and 12 in. thick are used under a double-track crossing of the Terminal Railroad Association of St. Louis and the Wabash at North Market street, St. Louis, Mo. The Chicago Great Western, on January 24, 1928, placed a precast concrete slab under its main line tracks at a crossing of the Missouri Pacific main line at Leavenworth, Kan.

A number of railways are now experimenting with precast reinforced concrete slabs in place of planks or other materials to carry traffic across tracks at important highway grade crossings. An average thickness of 5 in. appears to be most generally used.

The size of the slabs is determined more or less by the method of handling and placing. Usually the space between the rails is filled with two slabs, each about 2 ft. in width and about 6½ ft. in length. The edges or corners of the slabs should be protected with metal plates or curb bars to prevent wear or chipping. Some device should also be built into the slabs as may be required for lifting and handling them with derricks. The cost of a 5-in. slab, including material and labor, will run about $0.75 to $1.25 per sq. ft., and the entire cost of a properly constructed slab crossing, including preparatory work on the track and roadbed, drainage and other items, will probably run from $1.50 to $2 per sq. ft. of the entire area covered. Good drainage is particularly essential to prevent, as far as possible, the heaving of the slabs during cold weather, as it is a costly job to remove and replace them.

The slabs may be placed directly on the track ties or they may be placed on a board filler resting on the ties. The latter method is preferable as a good bearing surface for the slabs is made possible, and a standard slab thickness may be used by varying the thickness of the board filler for variable rail heights. Openings of ¼ in. to 1 in. should be left between adjacent slabs and between the slabs and the ball of the rail, to be filled with pitch or mastic.

Discussion

The discussion of this report indicated the growing use of concrete slabs of various types by the railways, although H. I. Benjamin (S. P.) stated that his road has found creosoted ballast deck construction to be more economical because of the higher cost of installation of heavy concrete slabs. J. S. Ekey, (B. & L. E.) described the placing recently of two single-track slabs each 32 ft. long and 16 ft. wide and weighing 120 tons by means of two wrecking cranes.

Mexican Railway Finds Floodlighting Advantageous

By B. E. Arias

Superintendent of Telegraph and Electricity, National Railways of Mexico

THE installation of floodlighting which has been completed, or is being installed, in 16 yards on the National Railways of Mexico has shown several advantages, notably a reduction in number of watchmen needed to police the yards and a decrease in the number and extent of thefts in loaded freight cars and storehouses. In its program for illuminating its most important yards, this road has adopted structural steel towers, 75 ft. high and appropriate projectors with 1,000-watt incandescent lamps. An average of four projectors are mounted on each tower. These towers have been so located in the yards that they provide practically uniform illumination of an intensity above 0.05 ft. candle, thus providing ample facilities for train movements at night.

Greater vigilance is possible and more easily attained with the yard lighting, and it has been possible to reduce the number of watchmen, with a corresponding saving in operating expenses. There has also been a noticeable decrease in thefts.

In order to supply the needs of our yards, the proper focusing of the projectors was studied. As a result, the average distance between the center of the area to be illuminated and the base of the tower is 574 ft. At this distance maximum illumination is obtained. In focusing the reflectors, the central beam was directed to the point where maximum intensity was desired (574 ft. from the foot of the tower), and with a divergence angle of 83 deg. the lighted area forms an ellipse whose axes are 853 ft. and 170 ft. long and whose area is 114,120 sq. ft. The average illumination intensity obtained in this area with one projector of 0.08 ft. candle.

Floodlighted Railroad Yards on National Railways of Mexico

Location	Towers	Area Illuminated
Installed During 1927		
Monterrey	7	103.8 Acres
Tampico	3	23.4 Acres
Villa Cecilia	3	23.4 Acres
San Luis Potosi	2	15.6 Acres
Toluca	1	7.8 Acres
Chihuahua	1	10.4 Acres
Cardenas	2	20.8 Acres
Buenavista (Mexico City)	5	41.7 Acres
Colonia (Mexico City)	2	20.3 Acres
Now Being Installed		
Monoalco (Mexico City)	7	91.0 Acres
Peralvillo (Mexico City)	2	20.8 Acres
Aguascalientes	8	73.1 Acres
Chihuahua	1	10.4 Acres
Nuevo Laredo	2	20.8 Acres
Torreon	2	20.8 Acres
Irapuato	2	20.8 Acres

Low-tension electrical energy is supplied to the reflectors when the power source is nearby and the loss of potential is small. In the yards where several towers are located and the source of energy is somewhat distant, high-tension energy at 2,200 or 4,400 volts is distributed by an aerial line to transformers located on poles near the towers, and the voltage is stepped down to 125 volts. The low-tension lines are carried to the towers at a height of about 28 ft. and a duplex armored cable is used to reach the projectors. This cable provides safety in installation and efficiency in service.

The circuits of each tower are controlled by means of a double-pole knife switch located in a weatherproof box at the base of the tower. Where there are several towers in one yard located at some distance from each other, the circuits are controlled from the high tension side, from a single point, which is as a rule one of the substations from where all the lighting circuits are fed.

Board Suggests Adjustment of Western Wage Dispute

Recommends that employees be given choice of three proposals and counter-proposals

WASHINGTON, D. C.

THE Emergency Board, appointed by President Coolidge on September 29 to investigate and report its findings on the wage dispute between the western railways and their conductors and trainmen, on October 29 submitted to the President its report. This was adopted on October 24 at Chicago, and concludes with a suggestion that the employee organizations be given another opportunity to accept one of three alternative proposals, representing substantially the offers heretofore made by the railways during the negotiations, effective as of May 1. The report was made public at the White House on October 30.

The board found that the railways would not have been justified in refusing an increase similar to that granted the engineers and firemen of the western district but that the differences which arose during the negotiations are proper questions for arbitration, "if the spirit of the law is to guide the actions of carriers and employees." It remarked that "it is difficult to see why this controversy should have arrived at a stage where it could not have been settled by mutual negotiations" and that the board regards the difference between what the railways have offered and what the employees had expressed a willingness to accept as "too small to justify an interruption of transportation."

Rules May Impede Efficient Operation

The board recognized that arbitration involves a certain amount of risk to the employees, but that on the other hand the perpetuation of rules, adopted many years ago, may become an obstacle to economical operation.

Hope was expressed that the principle of arbitration may be given a wider use and it was suggested that the rules limiting the use of double-headers be laid before the Interstate Commerce Commission for advice and report.

Proposals Suggested

In conclusion the board "suggests that the following proposals and counter-proposals be submitted to the employees for their election, and that the carriers abide by such election:"

1. Six and one-half per cent increase without change of rules.

2. Seven and one-half per cent increase and the elimination of the double-header and tonnage limitation rules.

Each of the above includes the continuation of existing differentials for mountain and other special service, and the addition of the requested increase to baggagemen for mail, express, and dynamo service.

3. The Washington agreement, providing for an increase of 7½ per cent on the standard rates for conductors and trainmen, and a procedure, including arbitration under the railway labor act, under which the double-header, helper district, car limit, and tonnage limit rules might be taken up by each carrier in special cases where a carrier claimed such rules produced burdensome or objectionable conditions.

4. That whatever proposal is accepted should be made effective May 1, 1928.

After a review of the history of the controversy the report of the board continues as follows:

The Situation on August 1

On August 1 the practical net result of the negotiations, ignoring minor matters, was:

The employees proposed 7½ per cent increase on standard rates for conductors and trainmen; no change of the rules; the new rates to be effective March 1, 1928.

The carriers proposed 6½ per cent increase on standard rates for conductors and trainmen; no change of rules; or 7½ per cent increase and the elimination of the double-header, tonnage, and car-limit rule; new rates effective July 16, 1928.

On August 8 a strike ballot was issued in which the employees withdrew their previous proposals for modification of their original demands. The result of the strike ballot by 90 per cent of the vote cast gave the officers and committees of the employees plenary power to settle the matters in dispute in whatever manner they might deem proper.

Thereafter negotiations were renewed and the so-called "Washington agreement" was executed, it being subject to and dependent upon the approval of the associations of the general committees of the employees. The essential provisions of the Washington agreement were an increase of 7½ per cent on the standard rates for conductors and trainmen, and a procedure, including arbitration under the railway act, under which the double-header, helper district, car limit, and tonnage limit rules might be taken up by each carrier in special cases where a carrier claimed such rules produced burdensome or objectionable conditions.

The new rates under the Washington agreement were to be effective May 1, 1928.

The employees declined to approve the Washington agreement. Thereafter they submitted a proposal for the modification of the Washington agreement, by limiting the extent to which and time within which cases arising under the double-header, helper, and tonnage rules might be considered, and further introducing the right of the employees to bring up the consideration of a pick-up rule. The carriers refused to entertain that proposal.

Throughout all negotiations the carriers have insisted that both wage increases and change of rules are proper questions for arbitration in the event the parties fail to agree; on the other hand, the employees insist that this wage increase is not a proper question for arbitration, because arbitrations and agreements resulting in increases had been made for conductors and trainmen, engineers, and firemen in the eastern and southeastern districts, and for engineers, firemen, and yardmen in the western district, hence another arbitration would be a useless expenditure of money and time.

A difficulty with that argument is that while the other train-service men had received increases, yet these particular men had been denied any increase under the arbitration award of June, 1927. However, an adverse discriminatory condition did result, which was recognized by the carriers in their offer of a 6½ per cent increase.

Evidence was presented by the employees tending to show that the increase of wages of railroad employees since the pre-war period has not been so great as in some other industries, and the conclusion was drawn that for this reason the classes represented in this dispute should receive increases greater than 7½ per cent.

Evidence on the same subject was introduced by the carriers from which they drew conclusions adverse to the conclusions drawn by the employees. Likewise the representatives of the Chicago Association of Commerce presented evidence and statements on this subject.

The industries selected for comparison, however, were but

few and presented only a partial view of wage changes which have taken place in all branches of employment. Apart from this we have felt that it would not be helpful in the present dispute to enter into a general wage inquiry to determine whether the wage level in any industry was equitably balanced with levels in other industries.

The question of change of rules presents another problem. The employees recognized the right of the carriers to present changes in rules for consideration of the joint conference between themselves and the carriers, but they insisted that this question of the elimination of working rules of long standing and general application ought not now be subject to arbitration; however, they later suggested the limited arbitration of certain rules as evidenced by their latest proposal.

Findings of the Board

The board finds—

1. Considering the increases granted to other train service employees in the eastern, southeastern, and western districts, and despite the award of June, 1927, the carriers would not have been justified in refusing an increase similar to that granted the engineers and firemen of the western district.

2. Considering the evidence regarding rates of pay and different working conditions of train service employees in the eastern and southeastern districts, and the rates of pay to engineers and firemen in the western district where working conditions are identical with working conditions of the employees in the case at issue, the carriers were justified in offering an increase of 6½ per cent to the standard rates, containing, in addition to the rates so increased, the existing differentials for mountain and other special service.

3. Considering that the increase to engineers and firemen in the western district took effect on May 1, 1928, it is thought by this board any increase granted to the employees in this dispute should take effect on the same date.

4. Considering the purpose and intent of the railway labor act and the evidence presented, the question of the wage increase demanded and the differences arising thereon during the negotiations are proper questions for arbitration, if the spirit of the law is to guide the actions of carriers and employees.

However, it is difficult to see why this controversy should have arrived at a stage where it could not be settled by mutual negotiations. At one stage or another of this long-protracted dispute the carriers have offered 6½ per cent increase with no change in rules; and at one stage or another the employees have expressed a willingness to accept 7½ per cent increase, with no change in rules. The difference between these offers, expressed in cents per basic day, amounts to from 5 to 7 cents per day. The board regards this difference as too small to justify an interruption of transportation in the territory affected.

Apparently the obstacle to a successful settlement has been the introduction, first by one side and then by the other, of certain controversies in regard to rules; and the effort of each party to change rules, as a basis of settlement, has somewhat befogged the wage issue.

In view of the fact that the conductors and trainmen have at least once, if not twice, during the negotiations agreed to accept a flat percentage increase of wages, irrespective of any vital change in rules; and that the engineers and firemen in this same western district received an increase of but 6½ per cent (instead of 7½ per cent as in the east and 6½ and 7 per cent, respectively, as in the southeast), we have not given serious attention to the specific demands of the conductors and trainmen for increases amounting to from 15 to 27 per cent.

If conductors and trainmen are to receive wages which are to place them on a nearer level to those of engineers and firemen, such a change should be divorced from the present controversy and considered on its own merits, entirely apart from the present dispute.

5. Considering the evidence presented regarding the origin of the double-header and tonnage limitation rule in 1903, and its modification, affecting changes in equipment, road structures, operation, tonnage, working conditions, and hazards, the problem presented is not free from difficulty.

A large part of the evidence at the hearings before the board related to rules. On the one hand the employees wish a change in the pick-up and drop rule; on the other the carriers wish the elimination or modification, through arbitration, of the double-header and tonnage limitation rules. These rules, however, involve technical questions affecting working conditions, over a wide range of territory, which can not be adequately understood or appraised in the brief time open to this board in making its report. The carriers express a willingness to leave the entire settlement of double-header rules to arbitration, but the employees object to signing an agreement which would involve them in a commitment to arbitrate new and uncertain demands which are not specified at the present time.

It is not the purpose, as we understand it, of the railway labor act to impose compulsory arbitration either upon the employees or on the carriers, and in this respect the position of the employees refusing to agree in advance to arbitrate all cases which might come under the double-header rule is not without merit. We were, however, impressed by the statements made by the carriers, that if such changes in double-header rules were submitted to arbitration, no sweeping changes would be asked for; and that the apprehension of the employees as to the effect of such changes was exaggerated.

The board recognizes that arbitration does involve a certain amount of risk to the employees in the protection of fair and reasonable conditions of employment, but on the other hand the perpetuation of rules, adopted many years ago, may become an obstacle to econmical operation.

Inasmuch as contractual agreements between the carriers and the employees usually run for but one year, it is to be hoped that the principle of arbitration may be given a wider use, in the expectation that from such experience an orderly method of procedure may be developed for the settlement of disputes.

In particular, it appears to us that the rules limiting the use of double-headers deserve a thorough investigation. There is also involved the question of the operation of long trains which the employees maintain increases the hazard of employment. The employees were insistent that the hazard was increasing; the carriers were equally insistent that train operation under current practice shows a decreasing hazard. We believe that this phase of the controversy can be settled only after an investigation by men skilled in technical and practical operation of railroads and suggest that the matter be laid before the Interstate Commerce Commission for their advice and report.

6. In regard to the pick-up and drop or conversion rule, conditions of operation vary on different roads. We believe that controversies on this subject should be settled by negotiations on the individual roads, or by adjustment boards, or through the services of the United States Board of Mediation when negotiations fail.

LAND of the Southern New England Railway, sold at auction in Providence, R. I., on October 16, netted $38,525 for the receivers' treasury. The Southern New England is the line from Palmer, Mass., to Providence, partly built, by means of which the Grand Trunk of Canada had planned to establish a terminal in Rhode Island.

* * *

Front View of a Colorado & Southern Locomotive

Telephone Dispatching on National Railways of Mexico

Delays reduced 46 per cent—Communication facilitated in case of accident—Aluminum conductors and rail poles used

By B. E. Arias

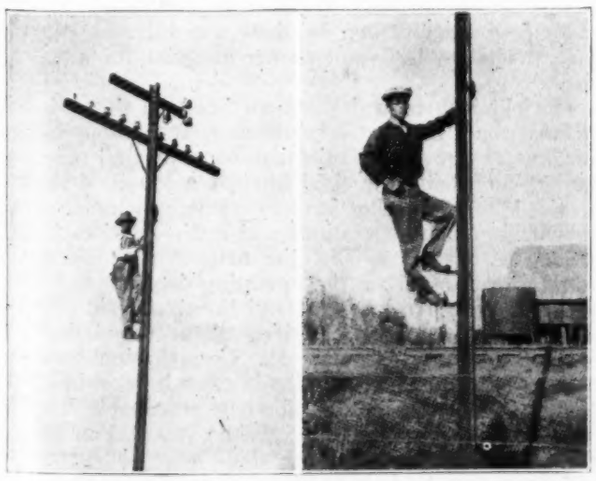
Superintendent of Electricity and Telegraph, National Railways of Mexico, Mexico City, D. F.

TELEPHONE train dispatching has been installed on two divisions of the National Railways of Mexico. The telephone system on the Cardenas division, extending from Cardenas, S. L. P., to Tampico, Tamps., has been in service since October, 1926, while that on the Monterrey-Golfo division, from Hipolito, Coah., to Monterrey, N. L., and from Monterrey to Tampico, was inaugurated in December, 1927. On the Cardenas division, an average of 3,500 train orders are handled each month and on the Monterrey-Golfo division 3,200 a month.

The length of our Cardenas circuit is nearly 163 miles and 23 stations and 21 telephone booths are connected along the line. On the Monterrey-Golfo division, No. 9 copper wire was used. The length of the circuit is about 420 miles, 38 stations and 38 telephone booths being connected along the line. A comparison of the telephone selective systems of the National Railways of Mexico, with those of some of the railroads in the United States, is given in the table. Our circuit on the Monterrey-Golfo division has a greater length than any of those circuits. Transmission on both the Cardenas circuit and the Monterrey-Golfo division is very efficient, and the utmost care is taken in the proper maintenance of the lines.

Train Delays Reduced 46 Per Cent

The telephone selective system for train dispatching presents many advantages over the telegraph system. Reports of the arrival, time of passing, or time of leaving of trains, as well as accident reports, can be sent in a fraction of the time formerly required, and can also be made more complete and explanatory. Greater safety in transmission and reception is attained. Any person who can use a telephone, can handle this system, whereas a person must be especially trained in order to use the telegraph.



Lineman Using Special Climbers to Ascend Poles Made of Used Rail

The Keys for Transmitting the Code Are Mounted in a Cabinet Placed Above the Dispatcher's Desk

During the first year of operation of the telephone selective system on the Cardenas division, train delays were reduced 46 per cent as compared with the previous year when the telegraph was used. On the Monterrey-Golfo division, during the month of March of this year, 408 trains were dispatched south, and 427 trains were dispatched north, with a total delay of five hours; thus the average delay per train was about 22 sec., a result which could not have been attained with telegraph operation.

The possibility of installing telephone booths along the line, presents a great advantage. Our records in the Cardenas division show that those telephones were used 1,919 times during the first year of operation. The telephone service also facilitated the use of motor cars on account of the ease with which the crews can get in touch with train dispatchers. In the case of washouts and accidents along the line, foremen of the track crews can easily communicate with the dispatcher.

The Advantages of Aluminum Line Wires

An interesting feature of the telephone line on the Cardenas division is the use of aluminum conductors. To the best of our knowledge, such material has not been employed for this purpose by any other railway in America. Hard-drawn copper wire, No. 9 A.W.G.,

has, as a rule, been used by most of the railways in the United States for telephone circuits. On the Cardenas division, steel core aluminum cable was used, after a careful study of its characteristics, inasmuch as the installation was conducted more or less along experimental lines.

Among the advantages of aluminum for this kind of work are the fact that it does not rust in any weather; but rather quickly becomes coated with a thin layer of oxide, which serves as a protection to the metal. The sulphorous fumes of locomotive gases do not attack it. Aluminum, being only one third as heavy as copper, permits the use of longer spans between poles, thus requiring a smaller number of poles for the line and, consequently, less expense Being lighter than copper, the

Table Showing Comparison of Important Railroad Telephone Dispatching Circuits

Railroad	From	To	Length (Miles)	Stations	No. Wire
New York Central	New York	Albany	155.3	41	No. 9 copper
Big Four	Indianapolis	Bellefontaine	138.0	45	No. 9 copper
	Cincinnati	Indianapolis	109.3	35	No. 9 copper
	Mattoon	St. Louis	129.3	45	No. 9 copper
	Indianapolis	Peoria	237.5	40	No. 9 copper
Southern	Monroe	Spencer	211.3	33	No. 9 copper
Canadian Pacific	Schreiber	White River	165.2	20	No. 9 copper
	Chapleau	Cartier	166.6	20	No. 9 copper
Pennsylvania	Altoona	Harrisburg	130.6	20	No. 9 copper
Nat. Ry. of Mexico	Cardenas	Tampico	162.0	23	No. 7 aluminum
	Hipolito	Tampico	420.0	38	No. 9 copper

stress on all parts of the supporting structure of the line is less, decreasing maintenance costs and increasing the life of the line. Construction and maintenance crews can handle it with less effort, and the cost ot erection and maintenance is thereby reduced. The cost of aluminum cable is about 13 per cent less than that of copper wire. Besides these advantages, aluminum cable, being of little usefulness otherwise, is not stolen as copper wire is.

Tests on solid aluminum wire, conducted a few years ago, were not successful because the metal crystallized rapidly and became brittle. Aluminum steel cable, No. 7 A.W.G., was, therefore, chosen for this line, it being the equivalent in section to copper wire, No. 9 A.W.G., which is generally used for telephone lines and has the same conductivity.

Nothwithstanding the advantages, some disadvantages are connected with the use of aluminum, these being mainly the difficulty of making successful joints, and the extreme care necessary when laying aluminum cable on account of its great ductility. In case of breaks, repairs are difficult and, in most of the cases, great lengths of cable have to be wasted. Repair gangs must carry heavy and cumbersome tools. Our experience with aluminum for this purpose has, however, been very satisfactory up to the present time.

In the construction of these lines, on both divisions, extensive use was made of structural steel towers 25 ft. high, and also of used rail poles. Only high-class insulators were installed, and the entrances to the offices along the line were made with 12-conductor No. 12 B.W.G. cable. On our telephone circuits, we use the Western Electric alternating-current system, the latest that has been developed for this purpose.

THE ROCHESTER & SODUS BAY LINE of the New York State Railways (electric) 34 miles long, is to be abandoned. The New York State Public Service Commission gave, on October 24, authority for the abandonment, stipulating that rails, ties and all overhead equipment be removed. This line has not for over five years earned its operating expenses and taxes, and the company states that the earnings of its entire system are insufficient to longer carry the burden of the loss on the Rochester & Sodus Bay line.

Rough Handling Can Be Reduced Through Supervision and Co-operation*

ROUGH handling begins with the employee who receives the freight at the l.c.l. door and loads it into the car, or with the shipper, in the case of carload commodities, and it is naturally incumbent upon the freight agency supervisors to see that such handling does not occur from these sources. My own observation indicates that damage from rough handling charged to switch and freight crews is actually caused by the local freight handlers in their loading of cars. There is no doubt that the proper stowing of freight in cars according to the character of commodity and its liability to shift, is a large factor in causing damage to freight. A car improperly stowed can have its contents seriously damaged enroute, even though rough handling does not actually occur in yards or in the course of transit.

When this first essential is properly taken care of by the loading agent and his forces, ordinary handling enroute will not cause damage; in fact, it takes a most unusual case of rough handling to register serious damage or breakage. Therefore, it seems imperative that proper handling and correct methods of loading are the first essentials, and are the best insurance which can be had against damage. If damage occurs after precautious loading has taken place, it eliminates any question as to whether there was rough handling and supervisors should not then accept the stereotyped excuse of "No rough handling while in charge."

The proper loading of cars to avoid damage is one which requires eternal vigilance on the part of the agent and his supervisory assistants. Some of us have the knack of being able to do many things properly in the course of our day's work. Others have a single track mind and cannot realize that things about them are being done contrary to instructions and good practice. Therefore, the prevention of improper loading, and the securing of proper supervision and co-operation with the agent in the carrying out of instructions, rests first in a careful selective employment of supervisors. A supervisor is supposed to know more than the man he supervises. He is superior in rank, talent, and experience. When he does not excel in experience and talent he is not proper material for a supervisor.

The old idea of a department head on the railroad knowing only his own department is fast disappearing. We know that an organization watching all of the corners and doing the right kind of a job must be supervised by men who have at least a fundamental knowledge of the operations and methods of each department. That is to say, the master mechanic must know something about the operating department. The superintendent, trainmaster and local freight agent, must certainly know something about the difficulties of the mechanical department. Co-operation between various department heads stimulates an interest in other departments which brings about a reasonable knowledge of the entire operation. When you find an officer who does not know anything about other departments, it follows that he is generally not deeply interested in

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* Abstracted from an address by J. L. Wilkes, president and general manager of the Jacksonville Terminal Company, before the Third division claim prevention meeting of the Atlantic Coast Line at Jacksonville, Fla., on September 10.

the success of other departments. He is not coming in proper contact with such department heads and therefore not co-operating fully in the successful operation of the railroad.

Little headway will be made in stopping this useless waste and damage to equipment until all employed understand that an honest effort is going to be made to correct it. Instructions and rubber stamp letters will not stop it. The men who are guilty of it have more excuses than the average dog has fleas. It is seldom that the men give a justifiable reason. I want to point out that it is practically impossible to have unusual rough handling in a freight yard, a break-up yard or a freight house, without someone in authority knowing it. For instance, a switch crew handling cars roughly enough to damage freight at the street freight house cannot escape the notice of either the special agent on duty, the car inspector, the freight house foreman, the watchman or the agent or some of his assistants.

It is improbable that rough handling will occur after the cut leaves the freight house and is enroute to the yard. The most likely cause in such a movement would be the emergency application of air brakes. This will not occur unless there is a possible accident impending, or some other unusual condition such as a bursted air hose or other emergency. Every time this occurs somebody knows it, and that somebody is in sufficient authority to be honor bound, as a supervisor or semi-supervisor, to make a report of it. When cars get in the freight yard, I maintain that it is practically impossible in the average yard, for them to be handled so roughly as to cause damage, without someone separate and distinct from the responsible crew knowing it. There are yard masters, terminal train masters, superintendents, chief clerks, general foremen of car inspectors, master mechanics, car inspectors, supervisors of track, track foremen, signal maintainers, in every sizeable yard whose attention must of necessity be attracted to rough handling.

I recall a case in a large yard in Jacksonville where I happened to be a visitor on business. A terminal superintendent, a trainmaster, a yardmaster, a master mechanic and a general foreman were with me. While we were talking, a switch crew, some ten or twelve tracks away from us, made a coupling which caused dust to rise in noticable volume and the noise could be heard for blocks. None of these officers took steps to investigate this at the time, but they passed the incident up with a laugh and the remark that as long as we railroad we will have it. So long as the officers take no more interest in the matter than in this case, rough handling will continue.

I make the statement, without fear of contradiction, that rough handling will not be frequent in the yard of a local freight station where the agent is energetically on the job to prevent it. The agent may lose some popularity momentarily with the crews, but not in the long run because his action will finally eliminate most of the troubles regarding rough handling.

One of the useless things on a railroad is a pussyfooting agent or supervisor. Firmness and determination to accomplish breed respect and co-operation of those supervised. Men like to follow a leader; they like to work in a systematized business; and nobody is happy and contented in an organization which is run on the "Catch as catch can" basis. Damage from rough handling will be limited to accidents and unforseen emergencies whenever the superintendent, the master mechanic, and the agent get together and agree among themselves that it is going to be done.

Looking Backward

Fifty Years Ago

Trains are now running on the Chicago & Alton between Mexico, Mo., and Marshall, while the entire distance from Marshall to Kansas City, 85 miles, is graded and ready for the iron. It is expected that the entire road, including the bridge over the Missouri river at Glasgow, Mo., will be completed by January 1.—*Chicago Railway Review,* November 2, 1878.

The conflict between the Denver & Rio Grande [now the Denver & Rio Grande Western] and the Atchison, Topeka & Santa Fe over the construction of a line in the Royal Gorge of the Arkansas river was ended suddenly on October 21 when a contract was signed for the lease of the Rio Grande to the Santa Fe. The lease is to take effect about December 1 and to continue for 30 years at a rental equal to 43 per cent of the gross receipts for the first year. The Santa Fe agrees not to build, operate or encourage any road, not already constructed, parallel to or competing with the Rio Grande's lines. All litigation between the two companies is to be abandoned and the Rio Grande is to be extended to the San Juan silver mines and through the Royal Gorge of the Arkansas river.—*Railway Age,* October 31, 1878.

Twenty-Five Years Ago

B. H. Mann has been appointed general foreman of interlocking of the Missouri Pacific.—*Railway Age,* November 6, 1903.

L. W. Hill, assistant to the president of the Great Northern, has been elected vice-president, with headquarters at St. Paul, Minn.—*Railroad Gazette,* November 6, 1903.

The property of all of the subsidiary companies of the Rock Island System in Texas has been consolidated as the Chicago, Rock Island & Gulf in order to conform to an order of the Texas Legislature requiring that all railroads operating within the state also be incorporated there. The consolidation includes 385 miles of lines and involves the Chicago, Rock Island & Mexico, the Chicago, Rock Island & Texas and the Choctaw, Oklahoma & Texas.—*Railroad Gazette,* November 6, 1903.

David Moffat and associates of Denver, Colo., have applied to the Mexican government for a concession to construct a railroad from Douglas, Ariz., to Cananea, Son., under the name of Mexican & Pacific Coast [now part of the Southern Pacific]. It is planned to build about 1,500 miles of line, from Cananea along the west coast of Mexico to Topolobampo, Sin., and Culiacan and Guadalajara, Jal.—*Railway Age,* November 6, 1903.

Ten Years Ago

According to a correspondent in France for the Chicago Tribune, the American railroad regiments are producing record results through the introduction of methods unfamiliar to the French, such as the operation of two independent railroads over the same line, the car record system and gravity switching.—*Railway Age,* November 1, 1918.

The Interstate Commerce Commission and the Railroad Administration have had their first open clash of authority over rates and the commission has overruled the contentions of the director general's legal department in the case of the Willamette Valley Lumberman's Association against the Southern Pacific.—*Railway Age,* November 1, 1918.

After several weeks of negotiation between the Railroad Administration and a committee of the American Short Line Railroad Association, Director General McAdoo, on October 25, approved a form of contract to be entered into with the short lines, which provides for taking back under a modified form of federal control those lines relinquished on July 1. The government will not actually take possession of these railroads or operate them until it is considered to be a wartime necessity, while all revenues from operation will accrue to the individual company and all expenses and taxes will be paid by the company.—*Railway Age,* November 1, 1918.

Communications and Books

Fuel Conservation

SAVANNAH, GA.

TO THE EDITOR:

We have heard and read a lot about fuel conservation and, no doubt, no inconsiderate amount of good has come as a result of the efforts that have been put forth in past years toward the saving of coal. To my mind, the question that confronts us more forcibly at the present time is this: Are all of the railroads saving all of the fuel that can be saved? No doubt, a great many roads are saving maximum amounts, but there are others that are not.

Fuel campaigns with which I am familiar and others about which I have read and heard depend, in a large measure, upon the loyalty of the men and the interest that they must exercise in order to obtain, at least, a measure of the results hoped for. Loyalty is almost always present, but we must consider human traits when the matter of interest in a particular subject is one of the essentials necessary for the success of the project. Human beings will, at one time or another, become intensely interested in every manner of activity. In results that would interest the human, however, no matter what the nature of the activity, whether work or play, interest is bound to wane unless an appropriate stimulus is provided. Various formulas have been and are now used for promoting the interest so much desired in the matter of fuel conservation, such, for example, as trophies, prizes and competition as between operating divisions and districts. In some instances no doubt cash awards are made for the best performances. The latter, in my opinion is the only formula that will produce constant interest, as among us humans the getting of money and more money is the one thing in life of which we very seldom tire. Of all of our activities this one trait of getting money and more money never lacks in interest.

I have in mind particularly a fuel campaign which provides for a monthly publication of fuel performances by engine numbers and crews, with a yearly award of a silver cup to the crew saving the most fuel for the year. This plan is followed by a railroad of average size, and the award is made to the best crew of the entire system.

This policy, I believe, is wrong. This particular railroad consists of six operating divisions, and no two of them are topographically the same, yet the engines of the grade divisions compete with those of the level divisions; the engines of the divisions with the majority of termini compete with the engines of the divisions handling, in the main through business. Competition of this sort is one sided.

Competition that is fair and into which is injected a stimulus that will promote constant interest in the subject should be productive of better results; at least, results that are better than those reflected through the reports made by some roads. Such a plan to my mind, should provide, first of all, for cash awards monthly; second, for competition as between engine crews of each operating division, or if the divisions are too large, as between engine crews on districts of the divisions; third, competition as between individual engines. In the case of the latter, where crews are not assigned to individual engines, appropriate divisions of awards could easily be made as between enginemen and firemen of the successful contestants.

The basis upon which performance should be measured, in the absence of better factors, should be gross ton-miles for freight service, passenger car-miles for passenger service and switching miles (or hours) for switching service.

There are, of course, objections to be raised to almost any plan that may be suggested and, particularly, with respect to a plan calling for cash awards. The policy of a railroad company may be against the awarding of cash prizes for such purposes. The saving of material that is as expensive as coal, justifies a change of policy. The question of expense necessary for the compilation of statistical data for purposes of the campaign is another objection. All of the data required under the plan outlined are at present required for other purposes, except as to distribution by individual engines. Engine performances are made by engines individually, and the recording of performances by individual engines involves a matter of so litle expense comparatively that is should not cause concern in the face of the possibilities for saving under such a plan. The monthly plan of award may be objectionable and the answer is that human interest must be intense indeed if it holds the fever heat from year to year with the possibility of a testimonial or a silver cup as a reward for its sincerity.

It is not my purpose to disparage any of the plans that are now followed in the interest of this important subject. My effort is, in this instance, to promote interest in the matter to a degree that will be productive of better results than are now being obtained. Posterity may need the coal that we are now not saving.

OBSERVER.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Measure of Depreciation in Railroads, by Cecil F. Elmes. "Why the railroad problem is special," p. 5-6. 22 p. Pub. by Cecil F. Elmes Organization, Chicago, Ill. *Apply.*

Hunger Fighters, by Paul de Kruif. Biographical sketches of men who developed wheat and corn, and fought diseases in plants and livestock, thus making possible our present production of certain types of foodstuffs. Illustrated. 377 p. Pub. by Harcourt, Brace & Co., New York City. $3.

Unit Costs of Railroad Service, 1915-1927. "(A study submitted to the Commission by the Director of Statistics)" and issued as Bureau of Statistics Statement no. 28152. 15 p. Pub. by Interstate Commerce Commission, Washington, D. C., *Apply.*

Travelways—Railways, Waterways, Airways, Highways. The Official Railway Guide of Chicago expands to cover modern transport facilities of various types with its issue of October 27, 1928, vol. 28, no. 43. 185 p. Pub. by Official Railway Guide, Chicago, Ill.

Railways, by W. V. Wood and Sir Josiah Stamp. ". . . the position of railways in the economic structure of all countries requires to be re-examined without prejudice from the past, but losing none of its lessons. . . . This book is neither a textbook on railway economics nor a manual of statistics, but it contains enough economics, statistics and history to form a basis for the new thinking which is here urged. . . ." p. 9, 11 in Sir Josiah Stamp's chapter (no. 1). 252 p. Pub. by Thornton Butterworth, Ltd., London, Eng., 2 shillings.

Periodical Articles

From Chicago to the Sea (By Canadian Consent), by Bernard K. Sandwell. Comment on the St. Lawrence waterway project with reference to Canadian railways (p. 695) and other considerations. Atlantic Monthly, November, 1928, p. 695-700.

The Relative Investment Value of Industrial and Railroad Common Stocks. "Adapted from a thesis by G. S. Farrar, submitted in the course in Corporation Finance in the Harvard Graduate School of Business Administration, January, 1928." Harvard Business Review, October, 1928, p. 69-74.

Elephants Again, by Major A. W. Smith. "At a conservative estimate, the elephant power employed in Burma and Siam alone is probably worth fifteen million dollars. It is not surprising that, with capital sunk to this extent, elephant knowledge should have become a fine science," p. 634. Atlantic Monthly, November, 1928, p. 633-642.

Odds and Ends of Railroading

An unusual record is possessed by John C. Keenan, who recently retired as clerk at the consolidated ticket agency in Pittsburgh, Pa. In his 53 years and 4 months of service with the Pennsylvania, Mr. Keenan never lost a day because of illness nor has he ever had a disciplinary mark placed against his record.

Yoicks! Yoicks!

Every year for the last five years the 3,000-acre Stokes estate near Ramsay, Ill., has been the scene of a brilliant gathering of fox-hunters. C. L. Denton, Illinois Central telegrapher at Ramsey, is secretary and treasurer of the Central Illinois Fox-Hunting Association, and one of the most enthusiastic promoters of this form of sport in the state. The association has approximately 300 members, many of whom own fox hounds.

A Fort Wayne Curiosity

An apple tree, three feet high, was found growing in the eave-trough atop the blacksmith shop of the Pennsylvania at Fort Wayne, Ind., by Oscar Lepper and G. W. Bowen, pipefitters, when they climbed to the roof recently, to make some repairs. It is believed that several years ago someone threw an apple core on the roof. Lodging in the trough amid a collection of cinders and dirt, it was kept moist by the condensation of steam emitting from several exhausts and grew to its present height.

Royal Passengers

With the presidential candidates dashing about the country, it may be apropos to mention royal travels. When the King of England traveled to Scotland recently with his suite, the journey from Euston station, London, to his castle at Balmoral, a distance of 565 miles, cost him about $2,500. In addition to the regular price of tickets, the royal party was assessed $3.50 per mile for the privilege of riding in the "Royal Train," which, while it is owned by the London, Midland & Scottish, is for royal use exclusively.

First "Freezer"?

The reported "granddaddy" of all refrigerator cars is a simple wooden box now standing in a barn near Cobden, Ill. This box, packed with ice, was first used in transporting fresh strawberries over the 323 miles of the Illinois Central between Cobden and the Chicago market, beginning in 1866. The originator of this ice-box system of shipment was Parker Earle, a fruit-grower of Cobden, and it is said that the first berries to reach Chicago in good condition brought as high as $2 a quart in the old South Water Street market. Mr. Earle subsequently became interested in various other types of perishable freight transportation, eventually developing his idea into refrigerator cars somewhat similar to the type at present so widely used. He also pioneered in the pre-cooling of perishable shipments, having a cooling house at Anna, Ill., with a capacity for ten tons of berries.

The Santa Fe's Hall of Fame

Like so many monuments set up in the grand lobby and adjoining alcoves of a hall of fame, the main and branch lines of the Atchison, Topeka & Santa Fe are dotted with stations named for men who have had a prominent part in its construction and operation. The Santa Fe Magazine gives a partial list of 87 officers and directors, both living and dead, whose names have been perpetuated in this manner. Holliday, Kan., and Pomeroy, Tex., head the list, being named for Cyrus K. Holliday and S. C. Pomeroy, incorporators and first and second presidents respectively of the Santa Fe. Included in the tabulation are 34 directors, 2 chairmen of the board, 9 presidents, 8 vice-presidents, 4 general managers, 3 secretarys, 3 chief engineers, 2 each of treasurers, assistant treasurers, assistant secretarys, assistants to the president, solicitors, general counsels and auditors and 1 each of assistant general managers, passenger traffic managers and construction engineers. Kansas contains the greatest number of towns named for Santa Fe men, with Texas and Oklahoma not far behind.

Youngest Track Foremen?

The grizzled railroad track foreman, weather beaten, greyheaded, and nearing the pension age, may be the popular conception of the holder of this responsible position, but in actuality the track foreman of today is often a vigorous young man in his early twenties. This conclusion results after a survey of Pennsylvania Railroad foremen on the road's Western Region. On seven of the nine divisions in the region, the youngest foreman is 25 or younger. One foreman is 20, two are 22, two are 24, and two others are 25. Harold English, of the Chicago Terminal Division, holds the record for the region. He was 20 just last month. William B. Weaver, the youngest foreman on the Cincinnati division, is now 22, but was made a foreman nearly two years ago, just before he completed his nineteenth year. Weaver has made a reputation for himself as a willing worker by keeping close watch of his territory both in and out of working hours. The other 22-year old foreman, Clifton C. McLaughlin, of the Toledo Division, has never had an accident in his gang since he took charge of it last May. A. J. Roper, the youngest foreman on the St. Louis Division, and Carroll E. Kirchner, Ft. Wayne Division, are both 24. Roper has been a foreman for two years. C. F. Lucas, Jr., youngest foreman on the Grand Rapids Division, comes of a family of track foremen. His father and older brother are both foremen on the same division. He is 25 and has been a foreman since 1926. Another father and son pair of foremen is on the Columbus division. G. O. Holden and his son, G. M. Holden, are both foremen, the younger man having held that position for nearly a year.

Football Heroes

The gridiron deeds of "Larry" Downs and "Red" Starbuck, as they are still known at their respective alma maters, have been recited on this page before. So far, however, Sir Henry W. Thornton, K.B.E., chairman and president, Canadian National, has hid the light of his football deeds under a bushel. Thanks to John W. Heisman, famous player and coach, Sir Henry's activities on the checkered field, were revealed in a recent issue of Collier's. Heisman, it appeared, played in the line for Pennsylvania University, and he was flanked on each side by two large gentlemen who tipped the beam at well over 200 lb. One of these was Harry Mackey, now mayor of Philadelphia; the other was "Harry" Thornton. Heisman's description of what happened on one occasion follows:

"Once at Penn, while Thornton and I were at guard and tackle, respectively, one of the coaches appeared on the field with a couple of hard-boiled heavyweights who, he explained, were prize fighters who had conceived the bright idea that it would help them get into condition if they tried a bit of football. They had made it clear that they would not bear down too hard on us college boys. The name of one was, if I remember correctly, Duffy. The other's name escapes me. At any rate, they were given line jobs on the scrubs and told to devote themselves to stopping us. It is wholly possible that Harry Thornton and I were a bit overzealous. Maybe we did disregard a few of the best rules. But then we were facing a couple of sluggers and it was then a moot question: Which was the rougher, football or boxing? In fifteen minutes the boxer whose name I forget quit. But Duffy stuck to Thornton, who, being speedy as well as hefty, was making quite a monkey of the prize fighter. And then Duffy lost his head and swung one from the sod. Thornton arose, rubbed his blasted chin, grinned at Duffy and cried: 'Good boy.' The next man to bury his face in the mud was Duffy."

NEWS *of the* WEEK

Maine Central, No. 29, Leaving Portland, Me.

THE CLEVELAND RAILWAY CLUB will hold its next meeting on Monday evening, November 5, at Hotel Hollenden. W. H. Davis will present a paper on a temperature study of car journals in motion.

THE CAR FOREMEN'S ASSOCIATION OF ST. LOUIS will hold its next meeting at Broadview Hotel, East St. Louis, on Tuesday evening, November 13, with a paper by M. E. Fitzgerald, general car inspector of the Chicago & Eastern Illinois, on loading rules.

NAMES OF PASSENGER TRAINS, about a thousand of them, are now listed in the Quarterly Supplement of the Official Guide. The list fills seven pages. It begins with Acadian and Adirondack and ends with "The York" which is a Canadian Pacific train between Montreal and Toronto. Some trains appear twice, being reported by two different roads; as, for example, the Harrisburg Special, between New York City and Harrisburg, Pa. The Montrealer, between Montreal and Washington, is entered by each of the five roads participating in its operation, and likewise its mate, the Washingtonian. About 40 titles begin with "New York" and as many or more with "Chicago."

Signaling Principles and Practices

The series of chapters on "American Railway Signaling Principles and Practices" which was begun by the Signal Section of the American Railway Association last year and of which Chapters V, VI and X have been printed, has now been carried out to the extent of adding three more chapters—VII, VIII and XXIII. The subjects of these chapters, with the prices of each pamphlet, are as follows (the lower prices being that for copies sold to railroad employees and the higher for non-railroad employees):

VII—Direct current track circuits; 15 cents and 25 cents.

VIII—Transformers; 15 cents and 25 cents.

XXIII—Highway crossing protection; 10 cents and 20 cents.

It is expected that the remaining 20 chapters, to fill out the program as prepared, will be issued at the rate of about three each year.

Canadian Equipment Output in 1927

Production of Railway rolling stock in Canada reached a new high record in 1927 according to figures recently published by the Dominion Bureau of Statistics. Reports cover the manufacture of new cars, engines and parts as well as the work done in the larger repair shops.

The total value of the 1927 production was $74,466,912 or two per cent greater than in 1926 and 40 per cent higher than in 1925. Thirty-five firms were among the reporting companies whose combined production for the year included 5,005 new cars, valued at $14,640,385 and 57 new locomotives, valued at $4,417,770.

N. E. L. A. Electric Traction Committee Goes Abroad

A committee appointed by the National Electric Light Association to study electric traction installations in foreign countries, sailed from New York on October 27. The committee consists of H. A. Johnson, Chicago Rapid Transit Company; R. Beeuwkes, Chicago, Milwaukee, St. Paul & Pacific Railroad Company; Louis E. Fischer, Illinois Power & Light Corporation and H. H. Field, Public Service Company of Northern Illinois. The committee expects to travel through England, Holland, Sweden, Norway, Switzerland, Germany, Italy and France, returning to the United States some time in December.

C.N.R. Earnings Up One-Third

Substantial increases in gross earnings and net earnings are shown by the Canadian National for the month of September and the nine month period from January 1, of the current year. In September gross earnings amounted to $25,383,151, as compared with $21,746,311 for September, 1927, an increase of $3,636,839.03 or 16.72 per cent. Operating expenses in September last amounted to $18,869,490 as compared with $16,866,816, an increase of $2,002,673, or 11.78 per cent.

Net earnings totaled $6,513,660, which compares with $4,879,495 for September 1927, an increase of $1,634,165, or 33.49 per cent.

During the nine months period from January to September inclusive, the gross earnings of the National System reached a total of $196,317,822, while in the similar period of 1927 the gross earnings amount to $178,019,585 an increase during the current year of $18,298,236, or 10.28 per cent. In that period of 1928, operating expenses amounted to $160,231,024 as against $151,017,244 in the similar nine-month period of 1927, an increase of $9,213,780 or 6.10 per cent.

For the first nine months of 1928, the net earnings amounted to $36,086,797, as compared with $27,002,341 for the similar period of last year, an increase for the current year of $9,084,456 equivalent to 33.64 per cent.

As a result of this the operating ratio for the first nine months of 1928 was reduced to 81.62 per cent from 84.83 per cent in 1927.

Signalmen Break With A. F. of L.

The American Federation of Labor, on October 23, suspended the Brotherhood of Railroad Signalmen from affiliation in the former organization. This action followed the adoption by the Chicago convention of the signalmen on September 15 of a resolution disapproving the settlement proposed by the Federation of the jurisdictional controversy with the International Brotherhood of Electrical Workers. Early in August the Federation notified the signalmen that they would be given 60 days in which to comply with the decision of the Los Angeles convention in 1927 with respect to the controversy.

Highway Crossing Accidents

Highway grade crossing accidents in the first six months of this year resulted in 1,097 fatalities, an increase of 36 compared with the corresponding period in 1927, according to a statement issued by the American Railway Association. Total number of accidents 2,634, an increase of 73; persons injured 2,934, an increase of 33. Reports show that 893 of the 1,097 fatalities resulted from accidents in which motor vehicles were involved; an increase of 40 over the first six months in 1927.

The percentage of increase in the number of highway grade crossing accidents has been less than the percentage

of increase in the number of automobiles in use during the past few years, which would seem to indicate that some progress has been made in educating the public concerning grade crossings.

More than 20 per cent of the accidents at highway grade crossings in 1927 resulted from passenger automobiles, motor buses and motor trucks crashing into the side of trains. Of the 5,596 cases in the 12 months of 1927, no less than 1,148 resulted from such a cause, 244 persons being killed and 1,636 injured. In many instances, the operators of these automobiles first crashed through crossing gates before striking the train.

West Virginia Motor Coach Decision Allowed to Stand

The Supreme Court of the United States on October 29 allowed to stand a decision of the supreme court of appeals of West Virgina of about a year ago, affirming a decision of the circuit court of Kanawha county, in that state, under which certificates of public convenience and necessity were granted for the operation of motor coaches by the West Virginia Transportation Company, a subsidiary of the Baltimore & Ohio, and the Monongahela Transport Company, a subsidiary of an electric railway, in preference to independent operators which had been granted certificates by the state road commission. The courts of West Virginia held that as the public policy of the state requires the protection of public utilities from unreasonable competition, when an existing carrier is one of several applicants for certificates permitting operation on the highways, the state road commission ordinarily should give it preference. The text of the decision was published in the *Railway Age, Motor Transport Section,* of October 22, 1927, page 801. Counsel for the independent operators applied to the Supreme Court for a writ of error, and argument was heard on October 26; but after listening to counsel for the operators the court said it was not necessary to hear from the railway counsel and on October 29 it announced that the writs of error were dismissed "for want of a substantial federal question."

D. L. & W. Electrification Progress

The major preliminary studies involved in the New York suburban electrification of the Lackawanna are rapidly nearing completion. The type of supporting structures for the catenary system has been determined upon and approved and a thorough investigation made of the various types and relative costs of bridges and designs for the same system. The location of all existing wires and cables along the right-of-way has been plotted for most of the zone to be electrified, to the end that numerous adjustments which will be necessary in order to avoid interference with the electrification construction can be arranged.

Motor requirements and energy consumption tests for various weights and speeds of trains have been studied and the problems of the most efficient and satisfactory spacing of sub-stations and the conductivity of the distribution system under different spacings have been determined. The arrangement of the yard area between the Hoboken terminal trainshed and the tunnel is one of the most important jobs in connection with the entire project, as much depends upon its proper functioning.

The supplies and materials required for construction will be fabricated during the winter months, for spring delivery, and the road expects to start construction work early next year.

Formal Opening of B. & M. New North Station on November 14

The Boston & Maine's new North Station at Boston, now approaching completion, is to be dedicated and formally opened to the public of New England on the night of November 14, with exercises and a banquet in the east waiting room.

To this event, President George Hannauer and the board of directors are inviting the B. & M.'s oldest commuters, and the passenger conductors and locomotive enginemen of longest service, along with the governors of each of the five states which the Boston & Maine serves and the mayors of every city on the Boston & Maine lines. Several of the governors have already accepted invitations to take part in the exercises, in which officers of the New England Council, other representative New England organizations and officers of connecting railroads have been invited to join.

On the day of dedication there will also be opened to the public a group of displays of New England resources and products from the states served by the railroad. These displays, arranged in ornamental cases which have been built into the walls of the east and west entrances, were assembled respectively by the New Hampshire, Maine, Vermont, and Massachusetts councils of the New England Council.

The formal opening will take place just a year to a day since the first announcement of the plans of the Boston & Maine for a modern passenger station to supersede the old North Station, and auxiliay projects embracing a $10,000,000 development of the terminal area. The opening will find the station proper complete, except for the northwest corner of the concourse where the construction of a new building for restaurant and possibly hotel purposes on the site of the old Boston & Lowell station was begun on August 20, as soon as the temporary station offices could be moved to the new North Station. The Boston & Maine management is still considering proposals from hotel interests for the building of a hotel of 500 to 1000 rooms above this sector, and the final decision will be announced shortly.

The formal opening of the new North Station itself will also find construction of the Boston Garden,—the big sports coliseum, convention auditorium and exposition hall which has been reared above it,—within a few days of completion. The 13-story North Station industrial building,—the office and warehouse structure which flanks the new North Station on the west where the Fitchburg Station

* * *

Professor Joseph Henry

Statue of Professor Joseph Henry, inventor of the electro-magnet, which was dedicated at Albany, N. Y., on October 18. It stands in front of Albany Academy in which institution Henry made his experiments. Professor Henry was born in Albany, December 17, 1797, and was professor of mathematics in the Academy. His experiments in electro-magnetism were made in 1827-1831, the first notable result being the ringing of a small bell at the farther end of a wire, one mile in length, which had been strung around one of the rooms of the Academy (1830). Professor Henry, in 1846, was appointed the first secretary of the Smithsonian Institution at Washington. A brief account of his life, with a portrait, was published in the *Railway Age*, November 17, 1923.

The inscription on the base of the statue reads: (Left) "I arranged around one of the upper rooms in the Albany Academy, a wire of more than a mile in length, through which I was enabled to make signals by sounding a bell.—Joseph Henry." (Right) "He discovered self-induction and his contributions to the knowledge of electro-magnetism are essential to the electric telegraph, the telephone, the dynamo, the motor and radio."

once stood,—will be ready for occupancy January 1.

Manufacturers of B. & B. Materials and Equipment Present Exhibit

Fifty-two manufacturers of bridge and building materials and supplies, associated with the Bridge and Building Supply Men's Association, presented exhibits at the Hotel Statler, Boston, Mass., during the convention of the American Railway Bridge and Building Association on October 23-25.

The officers who served this association during the past year were as follows: President, F. M. Condit, Fairbanks, Morse & Co., Chicago; treasurer, D. A. Hultgren, Massey Concrete Products Corp., Chicago; secretary, W. D. Waugh, Detroit Graphite Co., St. Louis, Mo.; honorary directors; John E. Nelson, Joseph E. Nelson & Sons, Chicago, and B. J. Wilson, Pocket List of Railroad Officials, Chicago; members of Executive Committee: R. F. Repasz, William Robertson Co., Inc., Chicago; D. A. Evans, Kaustine Co., Inc., Perry, N. Y.; G. C. Mills, Zitterell-Mills Co., Webster City, Ia.; P. C. Jacobs, Johns-Manville Corp., Chicago; S. A. Baber, High Grade Manufacturing Co., Cleveland, O., and J. M. Rutherford, *Railway Age,* Chicago.

At the annual election of officers held on Thursday morning, the following were selected to serve for the ensuing year: President, D. A. Hultgren, Massey Concrete Products Corp., Chicago; vice- president, W. D. Waugh, Detroit Graphite Co., St. Louis, Mo.; secretary, I. B. Tanner, Joseph E. Nelson & Sons, Chicago; treasurer, B. J. Wilson, Pocket List of Railroad Officials, Chicago; honorary director, F. M. Condit, Fairbanks, Morse & Co., Chicago; members Executive Committee: W. G. Lawrence, Johns-Manville, Corp., Chicago; C. H. McCormick, Ruberoid Co., New York; E. G. Whitmore, De Vilbiss Co., Toledo, O.; B. S. Spaulding, Fairbanks, Morse & Co., Chicago; S. A. Baber, The High Grade Manufacturing Co., Cleveland, O.; and J. M. Rutherford, *Railway Age,* Chicago.

A list of the companies exhibiting at the convention, together with the nature of their exhibits and the names of their representatives follows:

Aluminum Company of America, Pittsburgh, Pa.; literature and samples of aluminum paint; aluminum nails, aluminum shingles and aluminum dining car chairs; H. W. Ostrom.

American Hoist & Derrick Co., St, Paul, Minn.; literature and photographs of locomotive pile drivers and ditchers; H. W. Davis and Miss H. M. Hoeller.

American Railway Hydrant & Valve Company, Stapleton, S. I., N. Y.; hydrant cocks and valves; Wm. Volkhardt.

American Rolling Mill Company, Middletown, Ohio; samples of ingot iron and literature; H. M. Arrick and C. A. Kaiser.

American Tar Products Company, Pittsburgh, Pa.

American Valve & Meter Company, Cincinnati, Ohio; model of Poage style H water column with universal spout, and of Poage stock drencher; John T. McGarry, Dan J. Higgins and Cecil W. Stevens.

Byers Company, A. M., Pittsburgh, Pa.; literature and samples of Byers genuine wrought iron pipe; C. W. Damberg.

Carter Bloxonend Flooring Company, Kansas City, Mo.

Celotex Company, Chicago; display panels showing Celotex used as sheathing, as plaster base, under finished flooring as a sub-floor, and roof insulation; E. E. Kelly.

Chicago Bridge & Iron Works, Chicago; literature and photographs of steel water tanks; H. C. Brown and A. A. Kenney.

Cullen-Friedstedt Company, Chicago; moving picture of steel Burro crane; Wm. C. Bamber.

Dearborn Chemical Company, Chicago; samples of chemically compounded rust preventive; C. A. Remsen and C. F. Barnham.

Detroit Graphite Company, Detroit, Mich.; samples of metal protective paints; Robert Hintz and W. D. Waugh.

Detroit Steel Products Company, Detroit, Mich.

DeVilbiss Company, Toledo, Ohio; paint spray equipment for bridges and buildings; E. G. Whitmore and G. N. Norris.

DeWalt Products Company, Leola, Pa.; exhibition of the DeWalt woodworker; W. Ross Stevens and W. A. Lamb.

Dickinson, Paul, Inc., Chicago; caboose jacks, cast iron chimneys, roof ventilators, deck and roof drains and cast iron exhaust heads; A. J. Filkins and A. E. Engman.

Dixon Crucible Company, Joseph, Jersey City, N. J.; literature and samples of graphite paint and lubricants; H. A. Nealley.

Dunham Company, C. A., Chicago; specialties for low pressure steam heating systems; C. E. Roscoe.

Fairbanks, Morse & Company, Chicago; F. M. Condit, J. L. Jones, E. J. Coverdale, B. S. Spaulding and J. C. Flanagan.

Fairmont Railway Motors, Inc., Fairmont, Minn.; bridge and building gang motor car and motor car headlights; E. R. Mason, E. L. Clark, W. D. Brooks and C. F. Green.

Hastings Signal & Equipment Company, Boston, Mass.; tell-tale hanger and side clearance indicating device; Ross F. Hayes, R. W. Hastings, Harry H. Nayor and Benjamin B. Hastings.

High Grade Manufacturing Company, Cleveland, Ohio; literature and samples of fibre cement; S. A. Baber.

Ingersoll-Rand Company, New York; literature on compressed air equipment for bridge and building work; W. H. Armstrong and L. B. Abrams.

Ingot Iron Railway Products Company, Middletown, Ohio; model demonstrating the method of jacking corrugated iron culverts through embankments; A. W. Spaulding and W. R. Fraser.

Insulite Company, Chicago; samples of wood fibre insulation board and a model showing its application in building construction; Jack Frost.

Jennison-Wright Company, Toledo, Ohio; literature on creosoted timbers and flooring blocks; George L. Dresser and W. J. Clark.

Johns-Manville Corporation, New York; roofing materials, pipe and boiler insulations, waterproofing, industrial flooring and smoke jacks; R. P. Townsend, E. L. Colopy, C. D. Folsom and W. H. Lawrence.

Jones Paint Company, Rome, N. Y.; liquid and plastic roofing cement; A. de Wolfe Jones.

Kaustine Company, Inc., Perry, N. Y.; literature and models of chemical toilets and septic closet; Charles F. Smale and David A. Evans.

Lehon Company, Chicago; samples of asphalt roll roofing and asbestos shingles, waterproofing and roof coatings; Tom Lehon, J. W. Shoop and F. T. Carpenter.

Lewis Asphalt Engineering Corporation, New York; J. M. Roeschlaub.

Massey Concrete Products Corporation, Chicago; literature on reinforced concrete culvert pipe, cribbing and piling; also photographs; David A. Hultgren and Charles Gilman.

Metals Coating Company of America, Philadelphia, Pa.; samples and models showing the application of metal coatings; F. A. Barbey.

Murdock Manufacturing & Supply Company, Cincinnati, Ohio; hydrants, railway water service boxes, wall fountains and air valves; J. C. Endebrock.

National Lead Company, New York; literature on red and white lead; A. H. Sabin, F. E. Dodge, F. M. Hartley, Jr., and J. E. Hobbs.

Nelson & Sons, Joseph E., Chicago.

Nichols & Brother, George P., Chicago; duplex electrical control for turntables, and roller bearings for converting turntables to three-point bearings; H. E. Notley.

Northwestern Motor Company, Eau Claire, Wis.

Patterson Company, W. W., Pittsburgh, Pa.; tackle blocks; W. W. Patterson, Jr.

Patterson-Sargent Company, Cleveland, Ohio; L. J. McComb.

Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.; photographs and literature on steel water tanks and treating plants; J. A. Morley.

Pittsburgh Plate Glass Company, Paint and Varnish division, New York; paints, paint brushes and glass; John E. Leonard.

Pocket List of Railroad Officials, New York; copies of Pocket List of Railroad Officials; B. J. Wilson.

Robertson Company, H. H., Pittsburgh, Pa.; samples of protected metal roofing and siding, ventilators, skylights, sash and V-beam sheets; J. R. Sexton and N. S. Morris.

Robertson & Co., William, Chicago; literature on cinder conveyors, and sand dryers, also model of high-pressure lubricator; R. F. Repasz.

Ruberoid Company, New York.

Sherwin-Williams Company, Cleveland, Ohio; literature on metal protecting paints; H. A. Sturn.

Simmons-Boardman Publishing Company, New York; copies of Railway Age and Railway Engineering and Maintenance; Elmer T. Howson, F. C. Koch, N. D. Howard and R. E. Thayer.

Spraco Painting Equipment Company, Somerville, Mass.; paint spraying equipment; Frank G. Dennison and Frank A. Tredinnick.

U. S. Wind Engine & Pump Company, Batavia, Ill.; literature on tanks, steel towers, water columns and tank fixtures; also models; C. E. Ward.

Zitterell Mills Company, Webster City, Iowa.

Meetings and Conventions

The following list gives names of secretaries, date of next or regular meetings and places of meetings.

AIR BRAKE ASSOCIATION.—T. L. Burton, 165 Broadway, New York City. Next meeting, April 30-May 3, 1929, Stevens Hotel, Chicago. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred Venton, Crane Company, 836 So. Michigan B'lv'd., Chicago. Meets with Air Brake Association.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—J. D. Gowin, 112 W. Adams St., Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 S. Michigan Ave., Chicago. Next meeting, June 25, 1929, Denver, Col.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next annual convention, June, 1929, Mexico City.

AMERICAN ASSOCIATION OF SUPERINTENDENTS OF DINING CARS.—L. M. Jones, Supt. of Sleeping and Dining Cars, C. M. St. P. & P. Chicago.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 292 Madison Ave., New York.

AMERICAN RAILROAD MASTER TINNERS' COPPERSMITH'S AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamlin Ave., Chicago.

AMERICAN RAILWAY ASSOCIATION.—H. J. Forster, 30 Vesey St., New York, N. Y.

Division I.—Operating.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Freight Station Section.—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago.

Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York.

Protective Section.—J. C. Caviston, 30 Vesey St., New York.

Safety Section.—J. C. Caviston, 30 Vesey St., New York. Annual meeting April 23-25, 1929, Indianapolis, Ind.

Telegraph and Telephone Section.—W. A. Fairbanks, 30 Vesey St., New York. Next convention, Sept. 10-12, 1929, St. Paul, Minn.

Division II.—G. W. Covert, 431 South Dearborn St., Chicago.

Division III.—Traffic. J. Gottschalk, 143 Liberty St., New York.

Division IV.—Engineering.—E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Annual convention, March 5-7, 1929, Chicago. Exhibit by National Railway Appliances Association.

Construction and Maintenance Section.—E. H. Fritch.

Electrical Section.—E. H. Fritch.

Signal Section.—H. S. Balliet, 30 Vesey St., New York.

Division V.—Mechanical.—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual meeting, June, 1929, Los Angeles, Cal. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section.—V. R. Hawthorne, 431 South Dearborn St., Chicago. Annual meeting, 1929, Kansas City.

Division VI.—Purchases and Stores.—W. J. Farrell, 30 Vesey St., New York, N. Y.

Division VII.—Freight Claims.—Lewis Pilcher, 431 South Dearborn St., Chicago, Ill. Annual meeting, May 21-24, 1929. Hotel Willard, Washington, D. C.

Division VIII.—Motor Transport.—George M. Campbell, American Railway Association, 30 Vesey St., New York, N. Y.

Car Service Division.—C. A. Buch, 17th and H Sts., N. W., Washington, D. C.

AMERICAN RAILROAD BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. Ry., 319 N. Waller Ave., Chicago. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—R. G. East, Agricultural Agent, Pennsylvania Railroad, Shelbyville, Ind. Semi-annual meeting, December 6-7, 1928, Congress Hotel, Chicago. Annual meeting, May 22-24, 1929, Houston, Tex.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV). E. H

Fritch, 431 South Dearborn St., Chicago. Annual convention, March 5-7, 1929, Chicago, Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MAGAZINE EDITORS' ASSOCIATION.—Miss Page Nelson Price, Norfolk & Western Magazine, Roanoke, Va.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, C. M. & St. P. Ry., 11402 Calumet Ave., Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.—Secretary: E. H. Lunde, Federal Machinery Sales Co., Chicago.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Railroad Division, Marion B. Richardson, 30 Church St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—H. L. Dawson, 228 N. La Salle St., Chicago. Annual meeting, January 22, 1929, Louisville, Ky.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, District Claim Agent, Northern Pacific Ry., St. Paul, Minn. Next meeting, June 19-21, 1929, Detroit, Mich.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 413, C. & N. W. Station, Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Stanley J. Strong, 17th and H Sts., N. W. Washington, D. C.

ASSOCIATION OF RAILWAY SUPPLY MEN.—E. H. Weaver, Westinghouse Air Brake Co., 80 E. Jackson Blvd., Chicago. Meets with International Railway General Foremen's Association.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—W. D. Waugh, Detroit Graphite Co., St. Louis, Mo. Annual exhibit at convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—C. R. Crook, 129 Charron St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2nd Monday in month, except June, July and August, Great Northern Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF LOS ANGELES.—J. W. Krause, 514 East Eighth St., Los Angeles, Calif. Regular meetings, second Friday of each month, 514 East Eighth St., Los Angeles.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—A. J. Walsh, 5874 Plymouth, Apt. 18, St. Louis, Mo. Meetings, first Tuesday of each month, except July and August, Broadview Hotel, East St. Louis, Ill.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2nd Thursday each month, except June, July, August, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—(See Master Car Builders' and Supervisors' Association.)

CINCINNATI RAILWAY CLUB.—D. R. Boyd, 811 Union Central Bldg., Cincinnati, Ohio. Meetings, 2nd Tuesday in February, May, September and November.

CLEVELAND RAILWAY CLUB.—F. L. Frericks, 14416 Alder Ave., Cleveland, Ohio. Meetings, first Monday each month, except July, August, September, Hotel Hollenden, Cleveland.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R. Detroit, Mich. Exhibit by International Railroad Master Blacksmith's Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—W. W. Criley, Ajax Mfg. Co., Cleveland, O.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—L. G. Plant, 80 E. Jackson Blvd., Chicago. Next meeting, May 7-10, 1929, Hotel Sherman, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—S. A. Witt, Detroit Lubricator Co., 820 S. Michigan Blvd., Chicago. Meets with International Railway Fuel Association.

MASTER BOILER MAKER'S ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Annual meeting, May 21-24, 1929, Hotel Biltmore, Atlanta, Ga.

MASTER CAR BUILDERS' AND SUPERVISORS' ASSOCIATION.—A. S. Sternberg, Belt Ry. of Chicago, Polk and Dearborn Sts., Chicago.

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—Roy M. Edmonds, 1252 Syndicate Trust Bldg., St. Louis, Mo. Annual convention, April 23-25, 1929, Arlington Hotel, Hot Springs, Ark.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS.—James B. Walker, 270 Madison Ave., New York. Annual convention, Roosevelt Hotel, November 13-16, New Orleans, La.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, 1014 South Michigan Ave., Chicago. Exhibit at A. R. E. A. convention.

NATIONAL SAFETY COUNCIL.—Steam Railroad Section: A. W. Smallen, C. M. St. P. & P., Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings 2nd Tuesday in month, excepting June, July, August and September, Copley-Plaza Hotel, Boston, Mass.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3rd Friday in month, except June, July, and August.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings 2nd Tuesday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Bulding, Washington, D. C. Annual meeting, Cleveland, O.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 1406 Packard Bldg., Philadelphia, Pa. Annual meeting, November 21, 1928, Hotel Commodore, New York.

RAILWAY CAR DEPARTMENT OFFICERS' ASSOCIATION. (See Master Car Builders' and Supervisors' Association.)

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in each month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—Edward Wray, 9 S. Clinton St., Chicago. Meets with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—F. W. Venton, Crane Co., 836 S. Michigan Ave., Chicago. Meets with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meets with Mechanical Division and Purchases and Stores Division, American Railway Association.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York. Meets with Telegraph and Telephone Section of A. R. A., Division I.

RAILWAY TREASURY OFFICERS ASSOCIATION.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—T. F. Donahoe, Gen. Supvr. Road, Baltimore & Ohio, Pittsburgh, Pa. Exhibit by Track Supply Association. Next convention, Sept. 19-21, 1929, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings 2nd Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, West Nyack (Rockland Co.), N. Y. Meets with A. R. A. Signal Section.

SOUTHEASTERN CARMEN'S INTERCHANGE ASSOCIATION.—Clyde Kimball, Inman Shops, Atlanta, Ga. Meets semi-annually.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3rd Thursday in January, March, May, July, September and November, Ansley Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—R. G. Parks, A. B. & A. Ry., Atlanta, Ga.

TRACK SUPPLY ASSOCIATION.—L. C. Ryan, Oxweld Railroad Service Co., 80 E. Jackson Blvd., Chicago. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, Gen. Supt. R. S., New York Central, Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—W. J. Dickinson, 189 West Madison St., Chicago. Regular meetings, 3rd Monday each month, except June, July and August.

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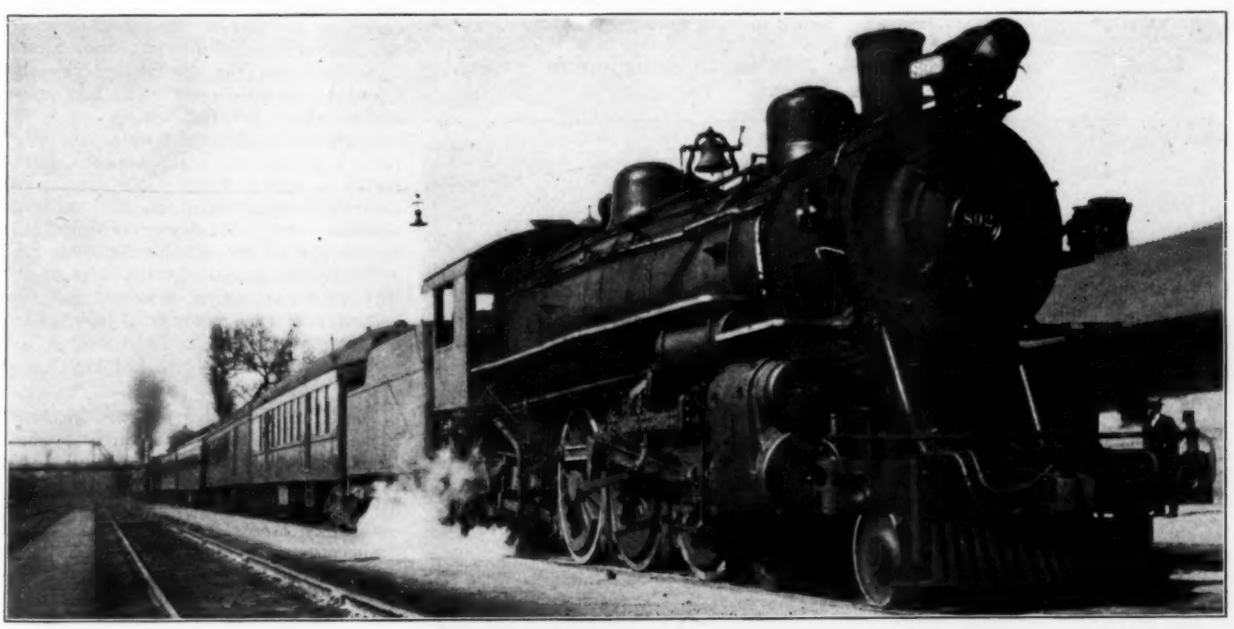

On the Rock Island

Traffic

The freight and passenger agency of the Erie Railroad at Oklahoma City, Okla., has been removed to Tulsa, Okla.; office in the Kennedy Building, Fourth and Boston Streets.

The Canadian Pacific is building 100 cottages in the prairie provinces in an effort to populate this territory in accordance with the British land settlement scheme proposed by Lord Lovat. Twenty cottages will be erected in Manitoba, 45 in Saskatchewan and 35 in Alberta. The cottages are being built on the property of farmers and will be available in the spring.

The New York Central and the New York, Ontario & Western announce a reduction, beginning November 10, of 1.5 cents per 100 lb. on ex-lake grain from Oswego, N. Y., to Boston and New York, for export. This reduction is made following an order of the Interstate Commerce Commission requiring this rate to be 1½ cents per 100 lb. less than the rate from Buffalo to New York

An agricultural instruction train is being run by the New York Central in central and western Pennsylvania, in connection with the Pennsylvania State College and other organizations, with the aim particularly to promote the introduction of better dairy sires. The train is expected to deliver 100 or more young pure bred Gurnseys, Holsteins and Jerseys, exchanging them for "Scrub" animals.

The Interstate Commerce Commission's hearing on the application of north-western fruit growers for lower rates to eastern and midwestern points, which has been in progress before Commissioner Clyde B. Aitchison since October 15 at Portland, Ore., ended on October 26 with the railroad's testimony and the rebuttal of the fruit growers. Commissioner Aitchison set December 31 as the date before which briefs are to be filed.

The New York Central, in co-operation with the Michigan State College, operated a demonstration train through southern Michigan during October, the purpose of which was to instruct farmers in the proper and effective application of mechanical power and modern farm machinery, along with the efficient use of human energy. One of the cars was devoted to exhibits of conveniences in the home. Approximately 10,000 adults visited the Farm Convenience train.

Great Lakes Regional Advisory Board Meeting

Optimism regarding the business situation of the Great Lakes district was expressed at the October 3 meeting of Great Lakes Regional Advisory Board, held at the Hotel Winton, Cleveland, Ohio. The consensus was that the district will not be affected by any slump such as is usually expected on the eve of a national election.

Business conditions in the district were reviewed by commodity committee chairmen who regarded the situation favorable for increased carloading in the fourth quarter of this year of 10.5 per cent over the loadings in the corresponding quarter of 1927. The estimated fourth quarter loadings are 605,418 cars as against actual loadings of 547,817 during the fourth quarter of 1927. Of 29 commodities which are included in the forecast, decreased loadings are expected in only three cases.

Texas Adopts Mileage Basis for Rates

The Railroad Commission of Texas has issued an order whereby freight rates in the state will be computed on a straight mileage basis, effective November 8, instead of on the common point freight rate system which has been in effect for more than 50 years. This sweeping order, which applies to the entire state, with the exception of four short lines, was made in an effort to remove the discrimination of existing intrastate rates against the new interstate rates prescribed by the Interstate Commerce Commission in the consolidated southwestern cases. To do this the state commission substantially adopted the intrastate mileage scale for this state.

The common point system now in effect provides for a sliding scale rate, reaching a maximum at varying distances on different commodities, after which the maximum rate becomes a blanket charge for any longer distances. Under the strict mileage scale adopted, the rate will gradually increase for the entire distance, thus being lower proportionately for the shorter distances, than heretofore.

Four short lines, the Jefferson & Northwestern, the Pecos Valley Southern, the Marshall, Elysian Fields & Southeastern and the Bartlett Western, are permitted to retain their special class and commodity differential rates, which enables them to make a small additional charge on the regular rates. Also existing class rates will continue in effect on several commodities including cotton, cottonseed, live stock, grain and grain products, sand and gravel and petroleum products, on which the new class rates would have been lower under one of the commission's general rules. In addition, the commission refused to change the present intrastate rates on bagging and ties, iron and steel articles, vinegar and candy, since well-defined relationships exist on these commodities between Texas intrastate and coastwise and import rates, and any attempt to readjust the intrastate rates before the final disposition of certain suspended coastwise and import rates would work to the disadvantage of intrastate movements.

In the order the commission also declined to cancel "water compelled" class scales (those lowered because of water competition) and special water-compelled rates applying for years between points on or near the Texas Gulf coast. Industries have operated on the existence of such rates, and shippers claimed that the request of the carriers for their cancellation was inconsistent in view of the carriers' recent action in seeking low cotton rates to meet motor truck competition to Gulf ports.

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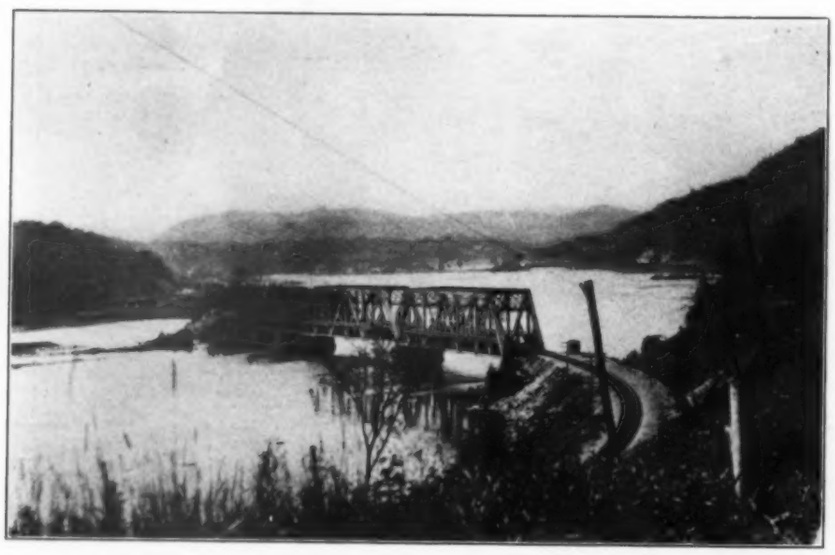

B. & M. Bridge Over the Connecticut River at Brattleboro, Vt.

PRESS DISPATCHES OF OCTOBER 26 REPORT A COLLISION at Recea, Rumania, in which 27 passengers were killed, including one American; and 20 or more were injured. By later dispatches the number of killed was much larger. A westbound express train, moving at high speed, collided with an eastbound local passenger train, wrecking the locomotives and several cars in both trains. The wreck took fire and many of the passengers were burned to death. The enginemen and firemen of both trains were instantly killed.

Equipment and Supplies

Locomotives

THE RAPID CITY, BLACK HILLS & WESTERN has ordered a 70-ton locomotive from the Heisler Locomotive Works.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 20 locomotives of the 4-8-4 type, for main line fast freight service, from the American Locomotive Company. These locomotives will have 70 in. driving wheels, 28 by 32 in. cylinders and a total weight in working order of 416,000 lb. Inquiry for this equipment was reported in the *Railway Age* of October 6.

Freight Cars

THE SOUTHERN PACIFIC, TEXAS LINES, has ordered 300 box cars from its own shops.

THE WABASH is inquiring for 2,000 automobile cars.

THE LEHIGH & NEW ENGLAND is asking for prices on the repair of 200 steel gondola cars of 50 tons' capacity.

THE RICHARDSON REFINING COMPANY, Fort Worth, Tex. is inquiring for 200 tank cars of 8,000 gal. capacity.

THE ST. LOUIS-SAN FRANCISCO has ordered underframes and steel parts for rebuilding ten box cars from the American Car & Foundry Company.

THE CHICAGO, BURLINGTON & QUINCY is rebuilding box cars at the rate of eight a day in its shops at Havelock, (Lincoln) Neb. During the last two years this shop has rebuilt more than 3,600 box cars.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 100 steel-underframe, steel-sheathed, automobile box cars of 55 tons' capacity, from the American Car & Foundry Company.

THE CENTRAL OF NEW JERSEY will rebuild 499 ice cars at its own shops. These cars purchased in 1911 and 1916 have reached a period when it is necessary to give them general repairs. Instead of rebuilding them as ice cars for which there is little demand at the present time, the railroad has decided to rebuild them as single sheathed box cars. They are equipped with all steel underframes, and cast steel trucks and when rebuilt will have incorporated in them modern improvements of present day construction. These cars, while of 80,000 lb. capacity, will carry a load limit of 92,400 lb.

Passenger Cars

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for 15 suburban coaches and 5 steel baggage cars, 70 ft. long.

THE DENVER & RIO GRANDE WESTERN is inquiring for 3 observation cars and 2 baggage and mail cars.

THE RAPID CITY, BLACK HILLS & WESTERN has ordered one 50-ft. gasoline rail motor car from the Edwards Railway Motor Car Company.

THE DELAWARE, LACKAWANNA & WESTERN has ordered two steel dining cars from the Pullman Car & Manufacturing Corporation. Inquiry for this equipment was reported in the *Railway Age* of October 6.

Machinery & Tools

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC is inquiring for one 24-in. shaper, one 2-in. by 24-in. turret lathe and one 18-in. by 12-ft. selective head engine lathe.

THE NILES BEMENT POND COMPANY has received orders for railroad equipment machine tools, including a 36-in. by 14-ft. lathe; a 13-in. by 48-in. Pratt & Whitney Model B lathe; a 7-in. by 32-in. Pratt & Whitney bench lathe; an Acme 2-in. double bolt cutter; three Ransom special 12-in. grinders; an Aurora 20-in. drill and a Niles-Acme 24-in. superheavy duty shaper.

Iron and Steel

Pennsylvania Places Orders for 159,600 Tons of Rail

The Pennsylvania has placed orders for 159,600 tons of steel rail out of 260,000 tons recently authorized by the board of directors to be purchased for use in 1929. The distribution of the orders follow:

Company	Tons
Bethlehem Steel Company	71,900
Carnegie Steel Company	46,900
Illinois Steel Company	31,300
Inland Steel Company	9,500

The Pennsylvania Railroad has reserved the right to increase each order by 70 per cent any time prior to October 1929.

Signaling

THE AMERICAN LOCOMOTIVE COMPANY has ordered from the General Railway Signal Company, 25 sets of automatic train control apparatus for installation on locomotives being built for use by the Cleveland, Cincinnati, Chicago & St. Louis.

THE MISSOURI PACIFIC has authorized the installation of automatic color light block signals on 271 additional miles of its main lines, work to be undertaken early in 1929, at a total cost of about $1,135,000. The portions of the railroad to be protected include the lines between Osawatomie, Kan., and Coffeyville, via Durand, 135 miles; Kansas City, Kan., and Atchison, 45 miles; Urania, La., to Alexandria, 46 miles; and 45 miles of the Illinois division. With this installation automatic block signals will have been installed on 1,507 miles of the Missouri Pacific, or about 41 per cent of the main lines, at an aggregate cost of more than $4,000,000.

Cleveland Union Terminal

The Cleveland Union Terminal Company has contracted with the General Railway Signal Company for the installation of electric interlocking to cover the whole of the terminal—a distance of 2½ miles between the extreme home signal limits; intended to be the largest plant in the world. The station is near the center of the layout.

The plans call for a machine of 560 levers, though at present only 13 of the 24 platform tracks are being put in service; and the number of working levers will be 310. The machine that is now being built will have 168 spare levers.

The switch machines will be model 5A, 220-volt, direct current; signals color-light, alternating current. All of the signals except those on the high-speed approach tracks will be four-indication dwarf. There will be four illuminated track diagrams, including one in the first story for the information of the maintainers.

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Entrance to Detroit River Tunnel on the Michigan Central at Windsor, Ont.

Supply Trade

W. D. Otter, with office in the Rialto building, San Francisco, Cal., has been appointed Pacific Coast representative of the **Electro-Motive Company**, Cleveland, Ohio.

Arthur H. Abbott, Inc., 88 Broad street, Boston, Mass., has been appointed district sales agent for the New England territory, of the **Roller-Smith Company**, New York.

Lowell S. Monroe, formerly advertising manager for the Electric Controller & Manufacturing Company, has been appointed engineer in charge of service data for the **Copperweld Steel Company,** Chicago.

The Brinard Sales and Construction Company, 114 Liberty Street, New York City, is to move on November 1, to Utica, N. Y., where its offices will be combined with those of the Signal Accessories Corporation, for which it is the general sales agent.

A new Prest-O-Lite gas plant at 3155 Twenty-seventh avenue, N., Birmingham, Ala. began operations on October 16. This plant will supply the local demand for dissolved acetylene used in oxy-acetylene welding and cutting. **A. J. Topham** is plant superintendent and **G. A. Andrews** is district superintendent, with headquarters at the plant. The **Prest-O-Lite Company, Inc.,** now has 34 acetylene producing plants situated in industrial centers throughout the country.

Poor & Company, Chicago, has been organized to take over the P. & M. Company, Chicago, the Maintenance Equipment Company, Chicago, the P. & M. Company Limited, Montreal, Quebec, the Canton Forge & Axle Company, Canton, Ohio, and the Vermilion Malleable Iron Company, Hoopeston, Ill., and P. & M. Company London Limited, which in turn owns 25 per cent or more of the capital stock of the P. & M. companies of France, Italy and Australia. The officers of the new company are president **Fred A. Poor,** vice-presidents **Philip W. Moore** and **Fred A. Preston,** secretary **H. Lutkins** and treasurer **H. C. Holloway.**

An agreement has been entered into between **E. I. du Pont de Nemours & Company,** Wilmington, Del., and the **Grasselli Chemical Company,** Cleveland, Ohio, having as its object a consolidation of the interests of the two companies. This agreement, is to be submitted for approval to the stockholders of the Grasselli Chemical Company on November 10. It provides for the retirement of Grasselli's six per cent preferred stock on December 31, 1928, at $110 a share, plus accumulated dividends to December 31. The Grasselli Company will receive, for subsequent distribution to its common stockholders, common shares without par value of the du Pont Company in number equal to one-fifth of the number of Grasselli's outstanding common shares without par value. It is understood that the combined chemical business of the two companies will be carried on under the name of the Grasselli Chemical Company, and no important changes are contemplated in the present administration of these activities.

William McBride, president of the Fort Pitt Spring & Manufacturing Company, Pittsburgh, Pa., resigned as of October 31. Mr. McBride, who was the principal stockholder in the company has sold his interests to Pittsburgh, New York, and Cleveland interests; **Ralph H. Tate,** Pittsburgh, **Henry S. Sherman,** Cleveland, and **C. H. Collins,** New York. These men will continue the company after November 1, as **The Fort Pitt Spring Company.** Mr. McBride was graduated as a civil engineer from the Rensselaer Polytechnic Institute, in the class of 1899, and has been identified with the spring industry since 1906.

William McBride

Obituary

James A. Smith, superintendent of the Schenectady, N. Y., plant of the General Electric Company for the last 15 years, died on October 25 at his home in Schenectady. Mr. Smith was born in Hartford, Conn., on May 25, 1873. In 1888 he entered the employ of Pratt & Whitney, at Hartford, Conn. From 1901 to 1903 he was associated with the Niles-Bement Pond Company, and, in 1905, was made superintendent of the Dutchess Tool Works, at Fishkill Landing, N. Y., which position he held until he entered the employ of the General Electric Company in 1910, as assistant to the mechanical superintendent at the Schenectady plant. A few months later he was made superintendent of one of the shops and became general superintendent of the plant in July, 1913.

Construction

CANADIAN PACIFIC—A contract has been let by this road to the Claydon Company, Winnipeg, Man., for the construction of a freight car shop at that point. The building with equipment will involve a total expenditure of more than $400,000.

ERIE.—This road has awarded a contract to Frank D. Brown, Inc., Jersey City, N. J. for the construction of a second track along its existing Eleventh street freight line in Jersey City.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—The general contract for the construction of new terminal facilities at Ashland, Wis., described in the *Railway Age* of October 27, p. 831, has been awarded to Frank Tomlinson, Ashland.

NEW YORK CENTRAL.—This road has received bids for work in connection with the reconstruction of its Pier I, North river, New York. The project is expected to involve an expenditure of about $75,000.

NORTHWESTERN PACIFIC.—This company contemplates the construction of a machine shop for locomotive repairs at Tiburon, Calif., at a cost of about $25,000.

PENNSYLVANIA.—A contract for the elimination of grade crossings in connection with the construction of an extension of Grogan Yards, Columbus, Ohio, has been let to the John F. Casey Construction Company, Pittsburgh, Pa. In addition to the separation of grades at Cleveland, Essex, Eleventh and Seventeenth avenues, the main tracks of the Toledo division will be relocated in the vicinity of the Ohio state fairgrounds. The cost of the entire project is estimated at $3,000,000.

RAPID CITY, BLACK HILLS & WESTERN—A contract for the construction of a roundhouse, machine shop and other terminal facilities at Rapid City, S. D., has been awarded to the Kepp Construction Company, Rapid City, at a cost of approximately $30,000.

SOUTHERN PACIFIC.—The Interstate Commerce Commission has authorized this company to construct a 6-mile line from Kerman, Calif., to Biola; estimated cost $252,379.

BAGGAGE COLLECTION AND DELIVERY SERVICE is now available in the city of Johannesburg, South Africa, to patrons of the South African Railways according to a recent general manager's bulletin of the South African Railways & Harbors Administration. The announcement states that the prospective passenger has but to notify the station master of his desire for the service and a motor truck will call at his door for the luggage. Charges for the service vary according to number of packages, weight and distance conveyed.

Railway Finance

BUFFALO NORTHWESTERN.—*Bond.*—The Interstate Commerce Commission has authorized this company to issue one general mortgage 6 per cent bond, series B, for $202,000, to be delivered to the Atchison, Topeka & Santa Fe to redeem securities it holds and which have matured.

GRAND RAPIDS & INDIANA.—*Extension Denied.*—The Interstate Commerce Commission has denied the application of this company for authority to build an extension to a cement plant at Petoskey, Mich.

KLICKITAT LOG & LUMBER.—*Abandonment of Operation.*—The Interstate Commerce Commission has authorized this company to abandon operation in interstate commerce of its 16-mile line from Klickitat to Plateau, Wash.

LOUISVILLE & NASHVILLE.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to procure the authentication and delivery of $11,426,000 of first and refunding mortgage 4½ per cent bonds, to reimburse the treasury for expenditures for road and equipment.

PERE MARQUETTE.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a 3.7-mile line in Saginaw and Bay counties, Michigan.

PORT ISABEL & RIO GRANDE VALLEY—*Charter Granted.*—The State of Texas has granted a charter to this company, authorizing it to acquire and operate the Rio Grande Railway, extending between Brownsville, Tex., and Port Isabel, 26 miles.

SOUTHERN PACIFIC.—*Construction Authorized.*—The Interstate Commerce Commission has authorized this company to construct a 6-mile line from Kerman, Calif. to Biola; estimated cost, $252,379.

Average Price of Stocks and of Bonds

	Oct. 30	Last week	Last year
Average price of 20 representative railway stocks.	122.11	121.80	116.58
Average price of 20 representative railway bonds..	93.51	93.73	96.18

Dividends Declared

Boston & Providence.—2½ per cent, quarterly, payable January 1 to holders of record December 20.

Georgia Southern & Florida.—1st and 2nd Preferred, 2½ per cent, payable November 28 to holders of record November 14.

Hudson & Manhattan.—Common, $1.25, semi-annually, payable December 1 to holders of record November 16.

Illinois Central.—Common, $1.75, quarterly, payable December 1 to holders of record November 9.

Maine Central.—Common, $1, quarterly, payable January 2 to holders of record December 15; Preferred, $1.25, quarterly, payable December 1 to holders of record November 15.

New Orleans, Texas & Mexico.—$1.75, quarterly, payable December 1 to holders of record November 15.

Panama.—$5.

Pennsylvania.—$.87½, quarterly, payable November 20 to holders of record November 1.

Reading.—First Preferred, 1 per cent, quarterly, payable December 13 to holders of record November 22.

Railway Officers

Executive

Dalton C. Olmstead, assistant to the general manager of the Union Pacific at Omaha, Neb., has been promoted to assistant to the vice-president in charge of operation, with headquarters at the same point.

C. R. Tyrrell has been elected president of the Port Isabel & Rio Grande Valley, with headquarters at Brownsville, Tex., following the acquisition by that company of the Rio Grande Railway. **B. F. Fain** has been elected vice-president, with headquarters at Brownsville.

Financial, Legal and Accounting

Louis P. Beck has been appointed assistant treasurer on the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y.

W. B. Sellers has been elected treasurer and **L. B. Brady** has been elected secretary of the Port Isabel & Rio Grande Valley, with headquarters at Brownsville, Tex. **W. B. Snell,** auditor of the Rio Grande, has been appointed auditor of the Port Isabel & Rio Grande Valley, with headquarters as before at Brownsville.

Operating

F. A. Donnell, has been appointed trainmaster on the Plains division of the Panhandle & Santa Fe at Waynoka, Okla.

O. L. Gray, acting trainmaster of the First district of the Albuquerque division of the Atchison, Topeka & Santa Fe, has been promoted to trainmaster of that district, with headquarters as before at Gallup, N. M. **R. G. Cranston,** acting trainmaster of the Third district of the Albuquerque division, has been promoted to trainmaster, with headquarters as before at Winslow, Ariz. The headquarters of **J. W. Walter,** trainmaster on the Clovis division, have been removed from Clovis, N. M., to Slaton, Tex.

J. B. Hamilton, trainmaster on the Illinois Central at Twelfth street, Chicago, has been promoted to superintendent of freight service with headquarters at Markham yard, Chicago, succeeding **F. T. Gibbs,** resigned. **R. W. Watts,** trainmaster at Markham yard, Chicago, has been transferred to Twelfth street, replacing Mr. Hamilton. **J. P. Kenney,** assistant trainmaster at Markham yard, Chicago, has been promoted to trainmaster at that point and **W. E. Curley** has been appointed assistant trainmaster at Markham yard, succeeding Mr. Kenney.

R. E. Brooks, superintendent of the Montana division of the Oregon Short line, with headquarters at Pocatello, Idaho, has been promoted to general superintendent of the Northern district of the Union Pacific, with headquarters at Cheyenne, Wyo. **Charles E. Brooks,** superintendent of the Utah division of the Oregon Short Line, with headquarters at Pocatello, has been transferred to the Montana division to succeed R. E. Brooks and **A. L. Coey,** assistant superintendent of the Western division of the Union Pacific, at Green River, Wyo., has been promoted to superintendent of the Utah division of the Oregon Short Line, succeeding Charles E. Brooks. **Joseph P. Larson,** chief clerk to the general superintendent of the Northern district at Cheyenne, Wyo., has been promoted to assistant to the general manager at Omaha, Neb.

Howard V. Platt, who retired on October 25 as general manager of Oregon Short Line, with headquarters at Salt Lake City, Utah, has had 43 years service with the Union Pacific system and its affiliated companies. Mr. Platt was born on July 27, 1865, at Lynn, Ind., and entered railway service in 1885 on the Union Pacific. For the following 18 years he was employed successively in train service, as a clerk, as a rules examiner, as a station agent and as a

Howard V. Platt

trainmaster. In March, 1903, Mr. Platt was promoted to superintendent of the Oregon Short Line, then being trans-

ferred to the Southern Pacific in 1905. He was promoted to general superintendent of the Southern district of the Southern Pacific, with headquarters at Los Angeles, Cal., in 1908 and to assistant general manager at Los Angeles in 1913 where he remained until 1916 when he was elected vice-president and general manager of the Oregon Short Line and the Los Angeles & Salt Lake. Mr. Platt had been general manager of the Oregon Short Line since 1918.

Hodge S. Taylor, chief clerk to the general superintendent of the Western lines of the Illinois Central at Waterloo, Iowa, has been promoted to trainmaster of the Indianapolis-Effingham districts of the Indiana division, with headquarters at Palestine, Ill., succeeding **C. W. Lentz**, who has been transferred to the East St. Louis (Ill.) terminal. **J. M. Chandler**, trainmaster of the Baton Rouge and Hammond districts of the New Orleans division at Baton Rouge, La., has been transferred to the Vicksburg, Natchez, Clinton and Woodville districts, with headquarters at the same point. **W. W. Cunningham**, assistant trainmaster of the Baton Rouge and Hammond districts of the New Orleans division, has been promoted to trainmaster of those districts, replacing Mr. Chandler, and Mr. Cunningham has been in turn succeeded as assistant trainmaster by **J. H. Kerr**, conductor on the New Orleans division. **W. M. Spencer**, night general yardmaster at Memphis, Tenn., has been promoted to trainmaster on the Memphis Terminal division, with headquarters at the same point. **Steve F. Lynch**, chief clerk to the superintendent of the Vicksburg Route division, has been promoted to assistant trainmaster on that division, with headquarters as before at Vicksburg, Miss. **J. P. Kenney**, traveling general yardmaster, has been promoted to assistant trainmaster on the Chicago Terminal division, with headquarters at Chicago, succeeding **Frank R. Campbell**, who has been promoted to trainmaster on that division, with headquarters at the same point.

Traffic

George G. Walker, commercial agent on the Erie, with headquarters at Pittsburgh, Pa., has been appointed general agent, with the same headquarters.

The headquarters of **William J. Sheridan**, general western freight agent on the Buffalo, Rochester & Pittsburgh, has been transferred to Buffalo, N. Y., effective November 1.

Harry J. Graham, who has been promoted to western traffic manager of the Delaware, Lackawanna & Western, with headquarters at Chicago, has been connected with that railroad for more than 26 years. He entered railway service as secretary to the receivers of the Illinois Midland (now part of the Pennsylvania) at Terre Haute, Ind., and later acted as secretary to the president of the Mackey System at Evansville, Ind., and as chief clerk to the general freight agent of the Peoria, Decatur & Evansville (now part of the Illinois Central) and general agent and assistant general freight agent of the Lake Erie & Western (now part of the New York, Chicago & St. Louis) at Peoria, Ill. In 1900, Mr. Graham was appointed manager of the Lackawanna Line, with headquarters at Chicago, where he remained until 1918 when he became an officer on the staff of the regional director of the Eastern region of the Railroad Administration. At the end of federal control, on March 1, 1920, he was appointed general western freight agent of the Delaware, Lackawanna & Western, with headquarters at Chicago. Mr. Graham's promotion to western traffic manager became effective on October 1.

Purchases and Stores

Edward T. Monroe has been appointed general purchasing agent of the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester.

John Eaton has been appointed assistant to the general purchasing agent, of the Canadian Pacific, with headquarters at Montreal. **W. J. Burns** has been appointed assistant purchasing agent at Montreal and **R. H. Yarnell** has been appointed assistant purchasing agent, with headquarters at Quebec.

Engineering, Maintenance of Way and Signaling

J. L. Campbell, assistant to the chief engineer of the Southern Pacific, has been appointed acting chief engineer of the Northwestern Pacific, with headquarters as before at San Francisco, Cal., temporarily succeeding **George H. Hicks**, deceased.

C. F. O'Connor, bridge and building master on the Canadian National at Kamloops, B. C., has been promoted to superintendent of construction of the Western region, with headquarters at Edmonton, Alta. Mr. O'Connor replaces **R. W. Graham**, who retired from active railway service on October 15.

A. L. Bartlett, division engineer on the New York, New Haven & Hartford at Boston, Mass., has been transferred in the same capacity to New Haven, Conn., succeeding **H. F. Fifield**, resigned. **T. P. Polson**, assistant division engineer with headquarters at Danbury, Conn., has been appointed division engineer, Boston division, with headquarters at Boston, Mass., succeeding Mr. Bartlett.

Obituary

George H. Hicks, chief engineer of the Northwestern Pacific, with headquarters at San Francisco, Cal., died at his home at Berkeley, Cal., October 21.

Dr. George G. Davis, chief surgeon of the Alton, Joliet & Eastern, with headquarters at Chicago, died on October 31 following a nervous breakdown.

William R. Canova, general agent on the Seaboard Air Line, with headquarters at Tallahassee, Fla., died at his home in Lake City, Fla., on October 25. Mr. Canova had been in the service of the Seaboard Air Line continuously for 34 years.

Charles S. Henning, chief engineer of the Mexico North-Western, with headquarters at Cindad Juarez, Chih., during 1913 and 1914 and since 1924 office engineer in the office of the assistant general manager of the Southern Pacific at El Paso, Tex., died in that city on August 7 at the age of 72 years. Mr. Henning was one of the group of engineers who located the Atchison, Topeka & Santa Fe line from Colorado to Santa Fe, N. M., and into Arizona in 1880. Later he was general roadmaster on the Santa Fe in New Mexico and subsequently he served as locating engineer on the Chicago, Rock Island & Pacific and on the El Paso & Southwestern (now consolidated with the Southern Pacific) and as construction engineer on the E. P. & S. W.

C. Salazar, superintendent of car service of the National of Mexico, with headquarters at Mexico City, D. F., died in that city on August 7. Mr. Salazar had been in the employ of the National of Mexico and the companies with which it was consolidated for more than 38 years. He was born on March 23, 1873, at Guadalajara, Jal., and entered railway service in May, 1890, as a clerk in charge of car movement and statistics in the office of the assistant general manager of the Mexican Central (consolidated as the National of Mexico). From 1894 to 1896 he served as assistant to the claims' clerk in the general freight and passenger office of the Interoceanic (also consolidated as the National of Mexico) and as clerk to the commercial agent, then becoming interpreter and translator in the office of the general manager and later chief clerk to the superintendent at Mexico City. In 1902 Mr. Salazar was advanced to car accountant at Mexico City, where he remained until 1909 when he entered the service of the National Railways as system car accountant. When the National Railways were placed under the administration of the Mexican government and renamed the Constitutionalist Railways of Mexico in 1914, he was appointed train and car order dispatcher in the office of the superintendent of car service, then being promoted to assistant to the superintendent of car service in 1915 and superintendent of car service in 1916. From July, 1919, to May, 1925, he was successively assistant superintendent of car service and assistant to the superintendent of car service, then being appointed car accountant when the National Railways were returned to private management. Mr. Salazar was appointed superintendent of car service of the National Railways in January, 1926.